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The identification and analysis of factors perceived as important to the success of interactive distance education

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THE IDENTIFICATION AND ANALYSIS OF FACTORS PERCEIVED AS IMPORTANT TO THE SUCCESS OF INTERACTIVE DISTANCE EDUCATION.

A Dissertation

Submitted

In Partial Fulfillment

of the Requirements for the Degree

Doctor of Industrial Technology

Approved:

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May 1995

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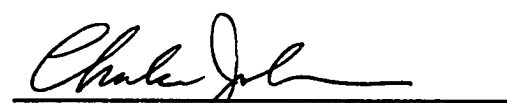

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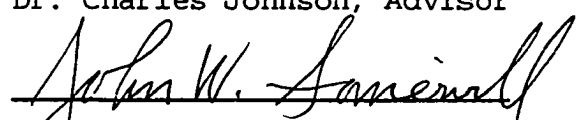

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There are several people who in many different ways made this research possible. They include my chair, Dr. Charles Johnson who never let me forget that it only takes one step at a time. Dr. John Fecik who started me on this path. A special thanks to Dr. Rex Pershing for not letting his retirement get in the way of this project. Dr. Robert Hardman, my boss, and mentor in the area of this study. Dr. Sharon Smaldino who never forgot that she also once trod this path. Early assistance with the selection of the statistical approach and analysis is credited to Dr. Greg Stefanich. In the final hours of this study Dr. Andrew Gilpin made what seemed to be major concerns in statistics of much less concern. Ms. Mary Howard was especially helpful with assistance in getting off the ground and kept flying in SPSS.

This study could not have been completed without the support of my friends and colleagues, who were not only participants in the Delphi but organized the distribution and collection of the instrument. To Mr. Dean Cramer, Mr. Gary Feddern, Dr. Ellen Kabat, Dr. Michael Simonson and Mr. Jon Weih, I thank you.

DEDICATION

This work is dedicated to Cynthia and Jacob.

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ABSTRACT

The purpose of this study was to provide distance education instructors, who teach over a two-way audio and two-way video interactive system, a list of strategies or skills that could be applied in the distance education environment to help ensure success. Further, differences in perceptions among users of the system regarding importance of these strategies were identified.

A Delphi study was done, utilizing a professional panel, to establish important strategies for distance education. The results of the Delphi study resulted in the identification of 99 important items. These items were placed in a survey which was administered to four groups of users of the Iowa Communications Network to determine perceptions concerning importance of these items. The validated survey was administered to the four groups made up of a 9 member professional panel, 20 community college faculty members and 247 of their students (93 students at origination sites and 154 students at receive sites).

Two non-parametric tests were utilized to identify significant differences in perceptions of importance on the items in the survey. The results of the statistical analysis of the Kruskal-Wallace H Test indicated that, in 89 of the items, there were no significant differences found at <.05 level. A second test, the Mann-Whitney U Test, was conducted on those 10 items with significant differences.

There was considerable agreement between the participants as to importance level of the strategies for successful distance education. The faculty and professional panel recorded the least differences in both tests indicating close professional agreement. The largest number of significant differences were found between the students at the origination sites and each of the other groups.

CHAPTER I

INTRODUCTION

The educational paradigm of learning at a distance, whether it is called distance education, correspondence education, or distance learning, refers to providing the opportunity to those who, whether by time or distance, are not able to take advantage of traditional learning opportunities. This model dates back to 1883 when opportunities to learn at a distance were first offered by written correspondence (Holmberg, 1986).

Early offerings in distance learning came not only from established educational institutions such as the University of London (Moore, 1987), and the University of Chicago (Watkins, 1991), but also from other sources such as the publisher of *The Mining Herald*, a daily newspaper in eastern Pennsylvania, who in 1891 offered a correspondence course in mining and mine safety; this ultimately became the foundation of The International Correspondence Schools. From this humble beginning, study by correspondence has evolved into a major component in education with programs in operation throughout the world.

Early forms of learning at a distance, based on print technology, were the precursors of the correspondence course as we know it today. The editorial staff of *Syllabus* (1992) notes that " . . . the print-based correspondence course, [the] oldest and the least technologically advanced approach

to distance education . . . in terms of sheer numbers . . . [is being used by more people] than any other distance education methodology" (p. 2).

Although print-based correspondence is a popular form of delivering education at a distance, the influence of electronic media is accelerating. Electronic media, such as cable, satellite, and fiber transmission, in a one-way environment, and the interactive communications offered by computer and audio/video teleconferencing are becoming very much a part of the distance learning environment. However, contemporary correspondence courses may consist entirely of study through print or may be a combination of print plus electronic media. The one constant, student/teacher interaction, will most likely be by means of print.

"Distance education" is a contemporary term that refers to learning at a distance where students and teachers communicate through print, or electronic means (Moore, 1989). The advent of technologies which allow for more than mere paper based correspondence resulted in the adoption of the term "distance education" as a formal educational concept in 1972 at the quadri-annual meeting of the International Council for Correspondence Education. The concept of distance education, although, was most likely introduced in 1969 with the establishment of the British Open University. The term itself was derived from the European terms, Fernunterricht, Télé-enseignement, and Educación a Distancia,

all of which describe "teaching-learning arrangements in which the learner and teacher are normally geographically separated and communicate through print, or electronic means" (Moore, 1989, p. 1). The concept was further refined by Keegan (1986), and Holmberg (1986), who stated that distance education should include--along with the concept of the separation of the teacher and learner--course design, learning process and instructional practice. Schlosser and Anderson (1994), who claim that since there is no best theory of distance education there is no best definition, may have best defined the concept by describing the goal of distance education:

> At the root of distance education theory is the belief that distance education is fundamentally different from traditional, face-to-face instruction and. . . . technological advances and new philosophies of distance education have resulted in a new paradigm of distance education, its goal to offer to the distant student an experience much like that of traditional, face-to-face instruction as possible. (p. 14)

The goal of distance education, as expressed in Schlosser and Anderson's review of the literature, is that distant education should offer the distance student an experience much like that of traditional, face-to-face instruction. With advances in technology, electronic means have made possible what most closely emulates face-to-face instruction, but according to Clark (1983), the concern does not lie in the technology as: "the best current evidence is that media are mere vehicles that deliver instruction but do

not influence student achievements any more than the truck that delivers our groceries causes changes in nutrition" (p. 445). But rather, according to Moore (1989): "the key to success in distance learning is the teacher, and if the teacher is good, the technology, no matter what it is, becomes transparent" (p. 87). Conversely, however, technology cannot overcome poor teaching.

This research study supports the findings of Clark and follows the lead of Moore who reveals the need for critical skills and training to successfully teach in a distance learning environment.

Statement of Need

The need for further research in the field of distance education may be best defined by what does not need further investigation. Moore, Thompson, Quigley, Clark, and Goff (1990) state that "The weight of evidence that can be gathered from the literature points overwhelmingly to the conclusion that teaching and studying at a distance . . . is effective" (p. 34). Moreover, Schlosser and Anderson (1994), in support of the Moore et al. (1990) findings, also indicate that there is an overwhelming amount of documentation supporting the effectiveness of distance education. They agree that distance education is an effective method of teaching, and while cautioning that most studies in distance education are limited in generalizability, also state that further research in this area would be of questionable value.

therefore, show that further research should be applied to other areas.

One of the most prevalent concerns emerging from the current literature, however, seems to revolve around the critical skills teachers must have to successfully teach in the distance education environment. As previously indicated the teacher is the key to successful distance education and the technology is only a tool and cannot overcome poor teaching. This concept is supported by the research findings of Moore, Thompson, Quigley, Clark, and Goff (1990) who conclude not only that good teaching by any method has equal results, but also indicate that distance teaching takes different skills.

Since the literature supports the concept that the teacher is the key to the success of distance education and that the teacher needs additional skills, further research efforts in distance education should focus on the identification of those teaching skills needed to successfully teach in the distance education environment.

A review of the literature, and personal communication with professionals involved in distance education (G. Feddern, July 26, 1993; R. Gross, June 8, July 27, 1993; R. R. Hardman, May 6, July 27, August 23, 1993; M. Simonson, July 26, August 26, 1993; S. E. Smaldino, July 27, August 26, 1993), yielded a list of possible areas of study. One of these arose from a program developed at The University of

Northern Iowa to "teach teachers to teach" over the Iowa Communications Network. The main thrust of the program is to help ensure the teacher's success in the interactive distance classroom, which precipitates the question of what can be taught that could help ensure that success?

This research study was based upon the precept that there are activities that can be practiced in the distance learning classroom, by instructor and student, which are important to the success of interactive distance education and that those factors could be identified.

Statement of the Purpose

The purpose of this study was to provide to distance education instructors, who teach over a two-way audio and two-way video interactive system, a list of strategies or skills that could be applied in the distance education environment to help ensure their success.

Statement of the Problem

The problem of this study was to: (a) develop a list of factors important to the success of distance education via two-way audio and two-way video interactive systems, (b) establish factors perceived as important to the success of distance education via two-way audio and two-way video interactive systems, and (c) identify any measurable differences in the perceptions of those factors between professionals, instructors, and students involved in distance education.

Research Questions

1. Which factors are perceived as being important to the success of distance education by a professional panel with distance education experience?

2. What is the extent of agreement, regarding factors deemed important to the success of distance education between: a professional panel, instructors who have taught or are teaching via distance education, students who have participated in distance education at the origination site, and students who have participated in distance education at a distant site?

3. What factors have been observed by: a panel of professionals in distance education, instructors who have taught or who are teaching via distance education, students who have participated in distance education at the origination site, and students who have participated in distance education at a distant site, which are considered desirable to the success of distance education?

4. What factors have been observed, by a panel of professionals in distance education, instructors who have taught or are teaching via distance education, students who have participated in distance education at the origination site, and students who have participated distance education at a distant site, that are considered undesirable to the success of distance education?

Delimitations

The following delimitations characterize this study:

1. The population was delimited to four disparate groups: (a) a panel of recognized professionals in the field of distance education in the State of Iowa, (b) randomly selected faculty from: Kirkwood Community College, Cedar Rapids; Eastern Iowa Community College District Colleges, Davenport; Iowa Lakes Community College, Estherville and; Iowa Central Community College, Fort Dodge, all of whom instruct via distance education, (c) randomly selected community college students, from the aforementioned institutions, who have received instruction via distance education at an origination site, (d) randomly selected community college students, from the aforementioned institutions, who have received instruction via distance education at a remote site.

2. Instruction was accomplished through a two-way audio and two-way video interactive system with an instructor at the origination site.

3. The instructor(s) selected for the distance education courses had taught a course or courses over the distance education system at least two times prior to the survey data collection.

4. The study used a researcher developed survey established to generate responses from the participants to

collect data in relation to their perceptions of specific learning activities in the distance learning environment.

Assumptions

The following assumptions were made in this study:

1. The survey for the professional panel, the instructors and, the students were the same.

2. A site administrator, who may have been present at some sites, did not have an effect on student responses.

3. The participants in the study were representative of the population.

4. All participants in the study answered the instrument questions accurately and truthfully.

Statement of Methodology

Population and Sample Selection

The population consisted of four disparate groups: (a) a panel of recognized professionals in the field of distance education in the State of Iowa, (b) randomly selected faculty from: Kirkwood Community College, Cedar Rapids; Eastern Iowa Community College District Colleges, Davenport; Iowa Lakes Community College, Estherville; and Iowa Central Community College, Fort Dodge who instruct via distance education, (d) randomly selected community college students, from the aforementioned institutions, who were currently enrolled in an instructional program via distance education at an origination site, and (e) randomly selected community college students, from the aforementioned institutions, who were

currently enrolled in an instructional program via distance education at a remote site.

Materials and Instruments

The instrument used in this study is a 100 item survey developed by the researcher.

Instrument Development and Validation

The survey was developed in six steps and evolved as follows:

Step 1. Identification of the survey items. A list of strategies related to the educational process in distance education were identified through a review of the literature. The strategies were placed in one of five categories: (a) preparing the participant for system use, (b) organizational aspects of the course, (c) teacher or instructor skills, (d) visualizing course content, and (e) human interaction. The strategies identified in the review of the literature were categorized as follows:

Preparing the participant for system use: student attitudes and active involvement, (Atman, 1989); teleclass teaching, user attitudes toward teleconferencing, (Bevan, 1983); personality traits and learning styles, (Bossons, 1988); preferred learning styles, (Coggins, 1989); teleclass teaching, (Cyrs & Smith, 1990); mandatory orientation, (Klinger & Connet, 1992); student responsibility, (Nelson, 1985); user resistance, (Pryor, 1985); and motivation (Wilkes & Burnham, 1991).

Organizational aspects of the course: organization of teleclass teaching, (Cyrs & Smith, 1990); use of feedback types, (Howard, 1989); necessary teaching behaviors-clear statements of purpose, (Haaland & Newby, 1984); importance of written assessment devices, (Hoyle, 1988); high structure allows too little autonomy, (Moore, 1987); necessary teaching behaviors, (Schaeffer & Roel, 1985); a written set of instructions or objectives suggested, (Sachs, 1991); and syllabus as master plan, (Wolcott, 1993).

Teacher or instructor skills: student perceptions of teacher weaknesses, including lack of teacher training, (Barker, 1988); identification of necessary teacher skills, (Boone & Bassett, 1983); major emphasis should be placed on training instructors, (Boone, 1984); instructor skills in teleclass teaching, (Cyrs & Smith, 1990); teacher skills, (Bronstein, Gill, & Koneman, 1982); effective teaching behaviors (Braucher, 1983); different skills are needed for distance teaching, (Moore et al., 1990); teacher active use of the interactive nature of the media, (Moore et al., 1990); necessary teaching behaviors (Schaeffer & Roel, 1985); supplemental skills and support required (Iowa Distance Education Alliance, Star Schools grant, 1992); distance education exaggerates the instructor's weaknesses (Wilkes & Burnham, 1991).

Visualizing course content: need for and development of presentation concepts (Hardman, 1993); discussion of creativity, (Heinzen & Alberico, 1990); teachers are required to change their method of teaching and give more attention to visual materials, (Moore, 1989).

Human interaction: importance of fluency, rate of speech, positive feedback, response time, and duration of oral statements, (Boone & Bassett, 1983); identifies skills such as: spontaneity, visuals, students names, change pace and generate discussion, (Bronstein et al., 1982); effective teaching behaviors (Braucher, 1983); importance of group learning, (Collier, 1966, 1980), and Beach (1974), and Rudduck (1978); the importance of interaction, (Klinger & Connet, 1992); observed effective teaching behaviors, (Haaland & Newby, 1984); importance of all group learning techniques, (Hiltz 1990); interaction is one of the main stages of teaching, (Moore, 1987); teleteaching techniques of clarity, enthusiasm, organization, pacing, and encouragement heightened student satisfaction, (Schaeffer & Roel, 1985); and, elimination of contact with other students, potential for hindrance of intellectual growth (Weisner, 1986).

Step 2. Compilation of the survey items.

A number of strategies culled from the above references were added to a list of strategies established through discussions with members of the professional panel,

professional teachers, and researcher observations in the distance classroom. These items were cross-referenced within the list and like items were removed.

Step 3. Delphi Round I.

The completed list of strategies consisted of 117 items. The professional panel members were asked to respond to the survey items as follows: (a) the panel members were asked to respond to each survey item by rating it on a 4 point Likert scale with 1 being "not important" and 4 being "highly important" to the success of distance learning. (b) the survey was carried out using a modified Delphi technique. Modification of the Delphi technique, in this study, consisted of compressing the typical four rounds into two rounds based on Borg and Gall (1983), who concluded that:

> Although the variability of responses tends to decrease from round to round, the mean responses tend to shift very little. Thus, a single mailing of the questionnaire probably produces as good descriptive data as the four mailings required in a Delphi study. (p. 414)

The responses of the Professional Panel were processed and the data analyzed. Those survey items with a mean of less than 2.5 were dropped from the next round in the Delphi.

Step 4: Delphi Round II.

In the second round of the Delphi the survey contained a list of 108 items. As in the first round Delphi, the professional panel was asked to respond to the survey items by rating them on a 4 point Likert scale with 1 being "not

important" and 4 being "highly important" to the success of distance learning.

The responses of the Professional Panel to the second round of the Delphi were processed and the data analyzed. Survey items with a mean of less than 2.5 were dropped from the survey.

Step 5: Final form.

The final form for the survey contained 99 items.

Step 6: Survey validation.

One class was randomly selected, from a pool of classes in the defined population, to validate the survey by running a pilot study.

Human Subjects Clearance

Appropriate documentation was filed with the University of Northern Iowa to initiate clearance for the research. The human subjects review was submitted to the University of Northern Iowa Institutional Board and was "determined to be exempt from further review." In accordance with university policy, as there were no identifying data pertaining to the participants required by the study, no participatory consent was required nor filed.

Data Collection and Analysis

1. The final survey instruments were sent to each member of the Professional Panel and, through a representative at each of the community colleges, to randomly

selected instructors teaching via distance learning and through them to participants in their classes.

2. Twenty faculty members who were teaching classes via distance education participated in the survey.

3. Of the 247 students who participated in the survey, 93 were located at the origination site with the balance of 154 students located at remote sites.

4. The completed surveys were processed (scanned) and the raw data recorded.

5. The Kruskal-Wallis H Test was selected as the first test for the data, based on personal communication with Dr. Andrew Gilpin (March 7, 1995), as: (a) there were three or more independent groups, four in this study and, (b) the data consists of numerical ranks. The Kruskal-Wallis H Test is defined by Witte (1989):

> When original observations are numerical ranks . . . there is no basis for speculating about whether the underlying populations are normally distributed with equal variances . . . it is advisable to use a test such as the Kruskal-Wallis H Test, which retains its accuracy even though these assumptions might be violated. (p. 384)

The level of significance was set at .05. Those survey items that were identified at the .05 level were further tested with the Mann-Whitney U test to determine whether the distributions of scores of two independent samples differed significantly from each other. The groups in the study as identified in the Research Question were: (1) professional panel, (2) faculty, (3) student at origination site, and (4)

student at remote site, were compared against each other in the following way: (a) 1 and 2, (b) 1 and 3, (c) 1 and 4 (d) 2 and 3, (e) 2 and 4, and, (f) 3 and 4. The level of significance was set at .05.

6. A statistically significant U means that the "bulk" of the scores in one population is higher than the bulk of the scores in the other population. The two populations are represented by the two independent samples on which the U test is made.

7. A write-in activity was added to the end of each survey to allow participants to comment on which activities or actions they felt were desirable and undesirable in the distance education classroom based on their experience in distance education.

8. The write-in responses to the survey were compiled in order to analyze responses in a qualitative manner.

Definition of Terms

The following terms are defined to clarify their use in the context of the study:

Distance Learning

Distance learning as cited in Rumble and Harry (1982), is one of the most precise descriptions and will be used in this study:

> 1. separation of teacher and learner during the main mode of instructional delivery, which distinguishes it from face-to-face teaching.

> 2. the influence of an educational organization, which distinguishes it from private study [and other non-formal education].
> 3. the use of technical media, usually print, to unite teacher and learner and carry the educational content of the course.
> 4. the use of two-way communication...which distinguishes it from other uses of educational technology [such as self-initiated learning using formal educational materials.
> 5. the teaching of students as individuals and [sometimes] in groups, with the possibility of occasional meetings of teachers and learners for social and didactic purposes.
> 6. the participation in an industrialized form of education [characterized by division of labor, automation, mass production, etc.- usually used by large scale but not small-scale distance learning systems]. (pp. 13-14)

Distant Site

Distant site is a remote, receiving and sending site for the course where the instructor is received live via television, rather than being in the classroom.

Factors Perceived as Important

Factors perceived as important to the success of distance education will be generated from a survey of a professional panel, distance education instructors, and distance education participants.

Human Interaction

Human interaction is distinctly important in the distance education environment as the barrier of distance must be broken and interaction between the instructor and participant becomes all important.

Iowa Communication Network (ICN)

The Iowa Communication Network is a fiber optic network designed to transport voice, data and video signals statewide and is the only one of its kind in the world. The ICN, to date, has approximately 2,800 miles of cable which connects one point of presence in each of Iowa's 99 counties (R. R. Hardman, personal communication, April 17, 1995). There are 141 ICN rooms connected at this time with 500 more sites planned for future connection, including hospitals, libraries, area educational agencies, governmental offices and national guard armories. The network is primarily dedicated to distance learning, and allows an interactive two-way audio and two-way video connection between any number of the 124 classroom sites on the system allowing distance learning opportunities in a totally interactive real-time environment.

Organizational Aspects of the Course

Organizational aspects of the course is best described as preparation and structure including defined performance requirements, goals and objectives, feedback processes and assessment.

Origination Site

Origination site is a receiving and sending site, for the course, where the instructor for the course is located,

and disseminates the course from. The origination site will have live participants whom the instructor is teaching.

Professional Panel

The professional panel will consist of Iowa educators who are recognized, for their work in distance education, and specifically in distance education via interactive, two way audio-two way video systems.

Preparing the Participant for System Use

Preparing the participant for system use is related not only to the use of the technology of the distance classroom but also strategies related to the educational process itself.

Teacher or Instructor Skills

Teacher or instructor skills is the introduction of strategies most beneficial in preparing the instructors to be effective in the distance education environment.

Traditional Classroom

The traditional classroom will be identified as any classroom where formal instruction is taking place; a classroom being used, by an instructor, for other than the purpose of sending a video image to a remote classroom, whether that remote classroom be 10 feet or 100 miles.

Visualizing Course Content

Visualizing course content is the use of any technology or process that would visually present educational materials,

and in this context include the "special" considerations of their use in the distance education environment.

Summary and Description of Subsequent Chapters

The identification of strategies which may be important to the success of distance education, was the area of concern in this study. The search to identify the critical strategies for distance education that are perceived as important to the success of distance education, rather than a study of the technologies of distance education, was at the heart of this study.

Chapter II

Chapter II was an in-depth investigation of the literature, and other sources to identify those strategies which may be important to the success of distance education. At the heart of this investigation were the educational strategies utilized in the traditional classroom and the potential to build on their strength to develop tools to be used in the distance learning environment.

Chapter III

Chapter III contains a detailed description of the methodology used for the data collection in this study. In addition the process of the development of the survey instrument is described. Moreover, it seeks to establish the importance of the items in the survey instrument based on the relationship of the values placed on them between the participants in the survey. This chapter contains a

description of the methodology and procedures used to perform this study. It is divided into the following sections: (a) sample and population, (b) materials and instruments, (c) data collection, (d) research questions, and (e) data analysis.

Chapter IV

Chapter IV was written to present the findings of this research. The chapter was divided into three sections: the first section describes the statistical process and rationale behind the selection of the items used in the survey instrument; the second section includes the report and interpretation of results of the statistical tests on the final survey instrument; and, the third section delineates the results of the informal questions gathered at the end of the survey instrument where they are reported.

Chapter V

The conclusions, discussion and recommendations resulting from this study are included, along with recommendations for further research.

CHAPTER II

REVIEW OF LITERATURE

Introduction

The evolution of new technologies and their use in distance education should initiate questions associated with their potential affect on instruction in the distance education classroom. The application of new technologies in distance education via such devices as Iowa's statewide fiber optic network, has piqued the interest of educators and provided rich opportunities for research.

The "Iowa Communications Network" (ICN) is a fiber optic network designed to transport voice, data, and video signals statewide. The ICN allows interactive two-way audio, two-way video connections between any number of the 141 ICN rooms on the system network allowing distance education opportunities in a totally interactive real-time environment.

Recent articles in two national periodicals touted the Iowa Communication Network, which connects 99 of Iowa's counties with 2,800 miles of fiber optic cable; from *Newsweek* (December 19, 1994), "Iowa is the first to have all of its counties hooked up through a fiber optics communications system that many experts say could be a model for the nation" (p. 55), and, *Network World* (November 21, 1994), " [Iowa] . . . serves as a model for other states and the federal government." The year 1995 will be the second full year of operation for the ICN and with students attending

over 100,000 hours of classes, researchers should continue to have many opportunities to explore its potential.

Purpose

There are three objectives behind the development of this chapter:

1. To explain what learning at a distance is, and to give the reader the sense of learning at a distance rather than a definition.

2. To describe the scope and direction of related research in learning at a distance.

3. To build upon the ideas identified in the review of the literature, and to defend the direction of this study.

Learning at a Distance

The correspondence course, which dates back to 1883, is the earliest mode of learning at a distance (Holmberg, 1986). Learning was accomplished through the written word and the print-based technology of that day; it continues today in much the same format. The print-based correspondence course, as suggested by the editorial staff of *Syllabus* (1992), " . . . is, in sheer numbers, being used by more people [worldwide] than any other distance education methodology" (p. 2). Although far removed from the traditional classroom, where student and instructor interact face-to-face, correspondence education has continued as a viable educational process. Correspondence courses remain as an important method of distance education and are often

supplemented, and frequently replaced, by electronic media (Moore et al., 1990).

The evolution in learning at a distance has continued as new delivery systems evolve. Advances in electronic communications technology have increased the potential for student/teacher interaction through the evolution of the telephone, radio, and television. Telephone and radio have been used as an instructional supplement in the distance classroom since the 1920s, while experimental television instructional programs were being implemented at the University of Iowa in the 1930s (Buckland & Dye, 1991). The development of satellite and fiber optic technology has dramatically changed the face of learning at a distance, although the idea of providing the opportunity to those who, whether by time or by distance, are not able to take advantage of traditional learning opportunities, has not changed. The effects of the changes that have occurred in the field of distance education have generated, along with the challenges of change, the need to have the educational practices of distance education acknowledged as good educational practices in any classroom. Schlosser and Anderson (1994) support this concept:

> It is known that good distance education pedagogy is good pedagogy in any classroom. In the future, if indeed not now, it may be that good education theory and good distance education theory will be one in the same. (p. 14)

Learning at a distance is difficult to characterize precisely as there is no one definitive description for what learning at a distance is, therefore no "one" definition.[1] A possible explanation for the lack of a generally accepted definition may lie in the fact that there is a lack of consensus among scholars about how to describe learning at a distance. There are as many differences between definitions as there are similarities. When defining distance education it seems that the differences are as important as the likenesses. Therefore, both must be addressed to gain some insight about what distance education is and what it is not.

Most definitions include some terminology describing the distance between the student and teacher: Moore (1973), Keegan (1986), Garrison and Shale (1987), Clark and Verduin (1989), Rumble and Harry (1982) agree on five points: (a) the instruction is under the influence of an educational organization; (b) the physical separation of teacher/student by distance; (c) the provision for two-way communication; (d) the dissemination of information from one to the other is

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[1] There are many individual differences between one definition of distance education and another, and to identify all would be a study in itself. It would be presumptuous to say that the comments stated here reflect all of the definitions of distance education, but they are reflective of those identified within this review.

through technology; and, (e) the majority of instruction occurs non-contiguously. The similarities between the definitions are those that describe the basic foundation of distance education, while dissimilarities seem to fall in what may be described as the supporting structures.

For example, there are dissimilarities in philosophy such as those found in Keegan (1986), Holmberg (1986) and Cropley and Kahl (1983) who say that distance education is a distinct and separate field of education, while Shale (1988) expresses the idea that what constitutes the process of education in both the traditional classroom and the distance classroom is the same.

There are dissimilarities in structure exemplified by disagreement on the degree of student responsibility for learning between the student in the traditional classroom as opposed to the student in the distance classroom. Keegan (1986) classified theories of distance education into three groups, one of which dealt with learner independence. The addition of the concept of student responsibility is also addressed by Wedemeyer (cited in Keegan 1986, p. 64) who says that "the system should place greater responsibility on the student;" Moore (cited in Keegan, 1986, p. 74) also postulates that "in distance education there is a gap between teacher and student, so the student must 'accept a high degree of responsibility for the conduct of the learning program.'"

This sampling of similarities and dissimilarities between definitions and philosophies of distance education shows that they are not so much at odds with each other, but rather, that this new field of study is still evolving. To borrow from Schlosser and Anderson (1994), in their review of the theory of distance education, the concept of distance education runs from: (a) distance education is difficult to define as the validity of the use of the term may be in question, as it is applied to different types of programs, serving different types of audiences, and using different types of media; to (b) a single best theory of distance education has not been developed as the experiences with distance education have been the experiences of the researchers themselves; and (c) distance education is different from traditional face-to-face instruction even though advances in communications technology has made face-to-face instruction available in the distance classroom; to (d) the American concept of distance education, which is based on face-to-face interaction.

The American concept of distance education is that distance education should be accomplished through such means, or delivery systems, which will allow face-to-face interaction in the distance classroom to closely emulate that of the traditional classroom. Support for this notion is expressed by Garrison and Shale (1987) who argued that distance education delivery technologies should be considered

as criteria when defining distance education: The essential characteristics of those criteria are that the majority of communication occurs non-contiguously, it is accomplished through two-way communication, and the communication is technology driven. These elements seem to characterize the current thinking in distance education, especially in the United States, as a high priority has been placed on the value of face-to-face interaction, which can only be achieved through technology. However, Moore (1993), in an editorial in *The American Journal of Distance Education* emphasizes the need to look beyond the use of technology for technology's sake:

> The American idea of 'distance learning' remains a very limited one. It is usually seen as the addition of high technology communications media in otherwise conventionally organized and taught classes. Because there is still a 'craft' view of teaching, most distance education programs suffer from amateurishness and are under resourced. Few educators, administrators, or policy makers have yet come to terms with the consequences of program design, for teaching and for redistribution of educational resources if these media are to be used anywhere near their maximum effectiveness. (Moore, 1993, p.3)

Thus far, the goal of this chapter has been to give the reader a sense of what learning at a distance is rather than definition. As we have seen, there is no one definition for distance education, although we can summarize basic factors among several conceptualizations to provide a sense of the literature on distance education.

To summarize this examination in search of the best definition of distance education, this researcher offers that distance education may be best described as follows: (a) the instruction is under the influence of an educational organization; (b) there is a physical separation of teacher and student by distance; (c) there is a provision for two-way communication; (d) the distribution of information from one to the other is through technology; and, (e) the majority of instruction occurs non-contiguously. Points (c) and (d), which are technology driven and most important to emulating the face-to-face interaction highly valued in the United States, are an important consideration in understanding this model of distance education. It is a model driven by the technology and as communications technology evolves so too must distance education.

The Scope and Direction of Previous Research Introduction

For many years activity in the field of distance education has centered on confirming the effectiveness of distance education and establishing distance education as a viable alternative to traditional on-site classroom instruction. Past research findings, far from exhausting the research possibilities in distance education, show the need for further research activities. The findings frequently indicated no significant differences between either type of classroom setting. However, as pointed out by Schlosser and Anderson (1994), the research has been narrow in nature and

most often lacks generalizability. This idea is supported by the findings of Eiserman and Williams (1987) who said that of 503 documents they found relating to distance education, few contained empirical evidence to support effectiveness of distance education.

Research in distance education has generally been aimed at: (a) questions centered on gathering demographic information being applied to attitudinal studies related to distance vs. traditional classroom instruction; (b) the viability of distance education, most often related to the question of whether students in distance education courses learn as well as those students in the traditional classroom; and (c) those studies dealing with the technology of distance education.

Attitudinal Studies

Studies in attitudes about distance education consistently find high levels of satisfaction: Leverenz's (1979) study supports this conclusion by showing the willingness of students to take further correspondence courses; Nelson (1985) reported that 97% of the students would enroll in another televised class; Barker (1988) found that almost 70% of the students enrolled in a satellite course would prefer a traditional classroom; Jurasek (1993) found graduate students in a distance education course had a positive attitude about distance education; and Johnson (1988), in a study on attitudes of students toward

interactive satellite instruction, found the students to be supportive of satellite delivery, but preferred the traditional classroom. These conclusions are typical of the findings in attitudinal research in distance education.

The Viability of Distance Education

Research studies dealing with the effectiveness of distance education have not all been positive. Denton, Clark, Rossing, and O'Connor (1985) suggested that it is not a surprise that nearly identical results will be produced when the study employs groups of learners with similar backgrounds, studying identical content under nearly identical conditions. Wiesner (1986) concluded that the telecourse was an isolating experience and may hinder intellectual growth by eliminating the opportunity for contact. This research would apply only to those courses that have little or no student/student or instructor/student contact.

Conversely, other studies indicate positive results such as Chute, Bruning, and Hulik's (1984) comparison of telecourse and traditional delivery, which shows that the post-test scores of the teletrained group were significantly higher. Boswell, Hamlin, and Mocker (1968) reported no significant differences in mastery of content in an introductory psychology class between students at a remote site versus students in a traditional classroom situation. Nunley (1965) reported a greater mean change in content

mastery in mathematics for the group in the telelecture group compared to the students in the traditional classroom setting. Beare (1989), who compared the effectiveness of three instructional formats, including telelecture, found that the formats had little effect on student achievement. Cheng, Lehman, and Armstrong (1991) found no significant differences between groups. Souder's (1993) study compared performances of college students at three different schools taking the same class, two through traditional instruction and the third via satellite. He found that students receiving instruction via satellite scored higher than the other two groups. The researcher attributes the higher achievement to factors other than the technology by showing that the group taught by satellite may have had an age and experience advantage. The research shows that distance education may be as effective as traditional education (Schlosser & Anderson, 1994).

The Technology of Distance Education

Concern with the technology of distance education is a common element in the literature. Most research did not relate directly to the technology as an overriding concern but as a facilitator of the instructional process. The technology, although important because of its ability to transport the information to the student from the instructor, and possibly back again, was generally not any more important than that. The value of the technology is in its ability to

reach. Clark (1983) provided a supporting view of the importance of the technology when stating:

> The best current evidence is that media are mere vehicles that deliver instruction but do not influence student achievements any more than the truck that delivers our groceries causes changes in nutrition. (p. 445)

Burns (1976), questioned studies which found a lack of significant differences in learning when using different media. And postulated that although the general consensus seemed to be that "...all objectives can be accomplished by any medium" past research had stopped short by not having asked the purpose of the medium. The conflicting attitudes of the importance of the medium, therefore, seems to lie not with the medium itself, but how it was used. Burns validated the importance of how the medium was used in the following:

> If media are used exclusively . . . as means of presenting information, then it is quite likely true that one medium is functional as another . . . however, if the learner is to interact . . . to achieve specified performances . . . than media may have attributes which will demonstrate significant differences. . . (p. 44)

This concept was further bolstered by Bates (1984) who stated, in reference to the use of media to compliment each other, "It is a great pity that as much energy is not put into this [the different ways in which each medium should be used] as there is in media production and distribution" (p. 227).

The objective of this section was to describe the scope and direction of previous research findings in learning at a

distance. Those findings consisted of attitudinal studies related to distance vs. traditional classroom instruction where researchers consistently found high levels of student satisfaction with distance education. There were studies which related to the viability of distance education which indicated that students in distance education courses were found to learn as well as those students in the traditional classroom. And although far from exhaustive, and limited in external validity, findings suggests that distance education is effective. In studies related to the use of communications technology in distance education, it was found that the value of the technology was in its ability to transport information to and from the student and the instructor.

Related Research

In this section of the review of the literature the emphasis shifted to focus on the application of techniques, processes, and methodologies of instruction. The shift in emphasis was done to identify effective distance education strategies, or "critical strategies" for the distance classroom.

As the review of the literature unfolded five major themes became apparent as potential critical strategies in distance education were identified. The five major themes were as follows: (a) preparing the participant for system use, (b) organizational aspects of the course, (c) teacher or

instructor skills, (d) visualizing course content, and, (e) human interaction.

Studies that were found to be associated with any of the five thematic areas were researched for their potential in the identification of instructor/student activities (critical strategies). The activities that had potential for influence in the distance education classroom were placed in one of the five thematic areas identified above and then assessed as an individual item in the survey developed for this study. The identification, analysis and selection process for this activity is explored in the following pages.

Preparing the Participant for System Use

In studies pertaining to distance education, the preparedness of the instructor to teach in a distance education environment was often referred to; however, there were scant references to student preparation for learning at a distance. Most references to student or learner preparedness dealt with the technical aspects of the system they would be using and virtually ignore criteria related to the "how-to" of learning in this environment. Most often the student at the distant site is ill-prepared for dealing with a teacher/instructor located some miles from them, and often the student may not be able to deal with a learning environment with which they are totally unfamiliar. In response Klinger and Connet (1992) suggested a "mandatory

orientation session to develop the lines of communication and comfort with the method of instruction" (p. 88).

Many of the studies that were related to the students' preparedness to operate in a new or different environment were usually attitudinal in nature. A study by Pryor (1985) discussed the problem of user resistance to teleconferencing and how that resistance directly affected their behavior. Furthermore, Bevan (1983), who examined user attitudes toward teleconferencing, found that although teleconferencing was seen as a threatening situation due to uncertainty, stress and change, that user attitude could be modified through training. Yet another viewpoint was offered by Atman (1989), who suggested that success for distance learners depends on the interaction of two factors, one revolving around curriculum and the other in the conative or striving domain. Atman went on to explain:

> The 'learning involvement' problem is particularly acute in distance learning programs. Under these conditions, the successful student must maintain his/her own level of active involvement through systematic interaction with the prescribed course of study and must depend for 'staying power' on his/her intrinsic motivational capacity - not on extrinsic motivational factors, e.g., energy derived from direct, personal contact with the course instructor. Not all students have this type of self-management capability. It is therefore important for the distance educator to take into account behaviors associated with successful striving and to encourage the development of those behaviors in their students. (p. 14)

Coggins' (1989) research on preferred learning styles showed that little information was available that identifies

factors which account for a student's success or failure in distance learning programs. Coggins follows Atman's lead by suggesting that an orientation program that emphasizes survival skills and learning how to learn at a distance would be useful. Moreover, Bossons (1988), reported that personality traits and learning styles have an effect on the success of learning at a distance. Her suggestion, to formalize the process of encouraging the behaviors needed to be successful in the distance learning environment through the development of guidelines to counsel different types of distance learning students and increase their degree of success, complements the work of Altman and Coggins. These findings suggest the importance of personality and learning style and that the distance learning educator must take that into consideration to ensure the success of the learner in the distance education environment.

Teacher/Instructor Preparation

The literature in distance education, though lacking in information on preparing the student for learning at a distance, is rich with material related to instructor preparation to teach in the distance education environment. However, the preparation consists mainly of acknowledging the fact that teaching at a distance is different from teaching in the traditional classroom. Most often reported in the literature is that the teacher, although at the center of the success of distance education, was not always trained to work

in that environment (Office of Technology Assessment report, 1989). Findings in a study of students in a course instructed via satellite suggest that one of the main weaknesses is inadequate teacher preparation and training (Barker, 1988).

Portrayals of the teacher as the key to the success of distance learning are most common in the literature. And most often, as Moore (1989) relates:

> the key to success in distance education is the teacher, and if the teacher is good the technology no matter what it is becomes 'transparent,' but no technology can overcome poor teaching. (p. 87)

Moore's conclusions were supported by Vandehaar (1986), who found, while investigating whether procedures of teleconferencing encouraged or limited student development, that the teleconferencing format did not act as a barrier to student development, but the behaviors of the instructors did, and concluded that this had " . . . important implications for the proper training of instructors in the teleconference classroom" (p. 345).

The following paragraphs from an Office of Technology Assessment document, *Linking for Learning*, may have most succinctly defined the role of teachers in the distance learning environment:

> The critical role of teachers in effective learning means that all must have training, preparation and institutional support to successfully teach with technology. Distance learning has dual impacts on teachers; as a tool for teaching and as a means to upgrade their own skills and professional development.

> Few teachers have had either teacher education or field experience that enables them to be effective distant teachers or successfully use technology in their own classroom.
>
> Although it is the technology that removes the barriers and expands opportunities for learning, it is the teacher who teaches. In distance learning, teachers find that they are required to change their method of teaching and give more attention to advanced preparation, student interaction, visual materials, activities for independent study and follow-up activities. (pp. 11-12)

Organizational Aspects of the Course

Advanced preparation and structure is an important factor in the distance education environment as it presumes clearly defined performance requirements, specified course goals and objectives, reaction through papers and tests, and planning. These elements are frequently identified as important factors when evaluating distance education, as in Haaland and Newby (1984) where clear statements of purpose were found to be statistically significant in a study related to effective teaching behaviors. This idea is refuted by Sachs (1991) who suggests " . . . there must be a written set of instructions or objectives with which students work" (p. 89).

Further structural considerations were identified by Wolcott (1993) in her study of the distance instructor's planning process. Wolcott concluded that the three features of the planning process are: term planning, emphasis on content and not process, and the syllabus as the planning focal point. The syllabus was identified as a most important

element of the study as it was not only a master plan for the instructor, but also a study guide for the student and was: " . . . designed to support the semi-independent learning of the students . . . [and was] a valuable aid that directed their thinking and learning" (p. 30).

The idea that quizzes and other assessments are highly important in the distance education classroom was supported by Hoyle (1988), who found that no feedback mechanism, whether direct contact with the instructor or classroom participation was as highly rated as quizzes and other written assessment devices. Moore (1987) concluded that

> in distance education because of separation of instruction and learning, it is essential for instructors to structure their communications more carefully and deliberately than is necessary in face-to-face teaching. (p. 14)

Moore (1987) also warned that distance education programs can be too highly structured allowing the students too little autonomy. He also noted that

> . . . while the objective of maintaining high academic standards may be achieved by such standardization, students can acquire an idea of knowledge as passive and unproblematic, bought in a package, like a commodity. (p. 16)

Teacher or Instructor Skills

Making the transition from the traditional education environment requires instructors to adapt their teaching methods to the requirements of the distance education environment. Moore et al. (1990) offered that "The key to the art is that the teacher actively uses the interactive

nature of the media, resisting the temptation to lecture" (p. 39). For most teachers this is a difficult transition and not every teacher can make it. The literature also shows that to make that successful transition most often requires training.

Boone and Bassett (1983) found that research identifying skills important in distance teaching had been based on personal opinions rather than systematic evaluations and conducted a study that more scientifically identified the skills necessary for successful distance teaching. A follow-up study by Boone (1984) found that teleconferencing is only as effective as the instructor and that a major emphasis should be placed on training instructors who teach via teleconferencing. These findings are reinforced by Moore et al. (1990) who concluded that good teaching by any method has equal results, and as previously indicated by Moore (1989), different skills are needed for distance teaching. They go on to say that training opportunities in distance education are limited, with most programs dealing with how to run the equipment and virtually ignoring the concept and practices of teaching at a distance. This weakness was also identified in the Iowa Distance Education Alliance, Star Schools' grant proposal (1992) statement of purpose:

> Effective teaching is critical in all educational endeavors, including successful distance education systems. Most effective teachers are successful in a distance education environment if they are prepared in

> the supplemental skills they need and if they are given the support they require. (p. 1)

The need for skills training, in the concept and practices of teaching in a distance education environment is further verified in a Kantrowitz and Biddle (1994) interview with Phil Smith, Director of the Office for State-Federal Relations in Iowa. When discussing the Iowa Communications Network, Smith states that "Teachers must be specially trained . . . or they'll end up teaching the same way they have for the last 30 years--but in front of a camera."

The need for the distance education teacher to be trained to teach in that environment is found throughout the literature; for example, Wolcott's (1993) study found that when planning instruction:

> . . . one would think that instructors might have paid greater attention to student characteristics, contextual factors, and instructional techniques...[and] they voiced little consideration for the medium of delivery and its potential to affect the course design and the dynamics of instruction. (p. 33)

Moreover, Wilkes and Burnham (1991) concluded that:

> distance education exaggerates the instructor's weaknesses . . . [and] time, energy and moneys spent on helping teachers adapt and improve over [distance education] systems may give the highest rate of return of any investment that could be made. (p. 49)

However, this would assume adequate training and not what was found by Batey and Cowell (1986) who reported that:

> With few exceptions, the best training is little more than a quick effort at the last moment before implementation or after problems have already appeared. Often teachers are left to grapple with the new programs

> on a 'sink or swim basis' under the assumption that no training is required. (p. 16)

Visualizing Course Content

Visualization, in this context, was defined as the use of any technology or process that would be utilized to visually present educational materials to the students. This would include not only commercially produced media, but also teacher produced materials. Few studies in the literature of distance education were directly related to visualizing the course content, although visualization was found often to be indirectly mentioned or implied within the references. According to *Linking for Learning*:

> In distance learning, teachers find that they are required to change their method of teaching and give more attention to advanced preparation, student interaction, visual materials, activities for independent study, and follow-up activities. (p. 12)

By the same token, the Iowa Distance Education Alliance, Star Schools grant proposal (1992), stated that, "most effective teachers are successful in a distance education environment if they are prepared in the supplemental skills they need" (p. 1). The main point is that the references to visualization, although usually indirect or implied, reflect the importance of visualization in distance education.

Human Interaction

Humanization. The definition of the term "humanization" by Moore et al. (1990) most aptly reflects the need for human interaction in the distance education environment.

Humanization is the "creation of an accepting environment which breaks down the barrier of distance and generates feelings of rapport between teacher and students" (p. 21). That notion is the first of a list of four techniques identified to further implement human interaction: (a) humanization, (b) participation, (c) message style, and (d) feedback.

Participation. Participation deals with the extent of interaction among student/teacher and student/student, and applies also to the capability of the system to allow that interaction. Moore's (1987) findings support the need for greater contact. He noted that interaction has been regarded as one of the main stages of teaching, and that many distance programs are now encouraging active participation to overcome the passivity of some distance programs. A good example was found in Ward (1990) who cited Dr. Thomas Arciniega, president of California State University-Bakersfield, speaking of two-way video:

> . . . I can look around and see on their faces if a point I'm making is clear . . . if I'm boring them . . . I can get that critical feedback . . . good teaching is being able to respond to such often unspoken clues. (p. 60)

A factor identified by Wiesner (1986), further magnified the need for active participation in technology based instructional systems: There is the potential for hindrance of intellectual growth when contact with other students is

eliminated. This view may be best supported by Garrison and Shale (1987), who argues that:

> . . . education is dependent upon two-way communication. . . . The quality and integrity of the educational process are dependent upon sustained, two-way communication . . . [and when applied] the result is that distant education is no longer necessarily an independent and isolated form of learning, but, instead, begins to approach the interactive ideal of an educational experience. (pp. 13, 15)

Other factors related to interaction were addressed by researchers such as Collier (1966, 1980), who established that students involved with group learning spend more time studying outside of class. Beach (1974) and Rudduck (1978) found that there was greater satisfaction with a course if student involvement was increased, which may be part of the reason behind the findings by Collier. In the "virtual classroom" approach to learning various labels are applied to what may be referred to as group learning techniques. The use of various labels allows for the premise that "learning involves the active construction of knowledge by putting new ideas into words, and receiving the reactions of others to those formulations" (Hiltz 1990, p. 59).

The idea of active construction may well include all forms of learner participation, whether initiated by the learner or the instructor, as it acknowledges the simple premise that conversation with your peer group, especially discussion related to course work, has an effect on the resulting learning process. The supposition of interaction

enhancing learning reinforces the idea that an environment which allows for student cooperation and mutual assistance is an important concept in the development of learning activities in distance education.

Message style and feedback. Message style and feedback refer to ways of enhancing the presentation through: (a) visual aids, (b) voice, and (c) short segments of instruction to maintain interest and attention. While feedback is both verbal and written, as indicated earlier, there is scant information dealing directly with visualization in distance education, unlike traditional education where this has been researched for years.

Most of the techniques discussed here were applied in the development of the survey items used in this research study. Haaland and Newby (1984) observed teaching behaviors that they identified as effective in the teleconference: a statement of purpose was expressed for the class session, the instructors used the student's names, printed materials were used in support of instruction, the instructor encouraged participation through discussion, and the instructor had a good speaking voice. These behaviors were promoted in a study by Schaeffer and Roel (1985) who suggested that knowledge in teleteaching techniques such as clarity, enthusiasm, organization, pacing, and encouragement may alter

instructor behavior in the teleteaching environment thereby generating heightened student satisfaction.

Bronstein et al. (1982) provided similar guidelines aimed at maintaining spontaneity: don't read from notes; employ the effective use of visuals; use the students' names; change pace frequently, and encourage discussion. In addition, Boone (1984), stated that teachers should model appropriate behavior, share authority by asking for participation, and provide humor. Other skills, such as developing a friendly atmosphere, using words carefully and accurately, and expressing feelings by tone of voice are also described. Furthermore, Boone and Bassett (1983) added fluency, rate of speech, positive feedback, response time, and duration of oral statements as important factors for fostering student satisfaction. All of which, if practiced with persistence, would most often make the distance education experience successful for both student and instructor.

Klinger and Connet's (1992) statement on the importance of interaction and feedback provided an apt conclusion for this section:

> The importance of 'interaction' in the telecourse design becomes a vital element to be added to the implementation process. Feedback, as a primary tool to ease interaction and ultimately dialectic communication, is essential for the student to remain interested and steered forward for success. (p. 88)

Summary

The purpose behind this chapter was the development of three objectives: (a) learning at a distance, (b) scope and direction of previous research, and (c) defend the direction of this study.

Learning at a Distance

To express what learning at a distance is and to give the reader an operational sense of learning at a distance rather than a mere definition.

This charge was a difficult one to fulfill as the concept of distance education has not been defined by practitioners in the field. As distance education is a relatively new field and has not yet generated a theory of distance education that all practitioners can accept, it will continue to be in flux. To simply characterize the current thinking in distance education, especially in the United States, one might say that a high priority has been placed on the value of face-to-face interaction. The researcher offers the following: That the majority of learning occurs through non-contiguous communication, that it involves two-way communication and, that most often the communication is technology driven.

Scope and Direction of Previous Research

To describe the scope and direction of previous research findings in learning at a distance.

Previous research was generally involved in the validation of distance education and although the research is far from exhaustive, and limited in external validity, it shows that distance education is effective. A second area of emphasis was in the technology and the importance placed on it, which, although very important in its ability to transport the information to the student from the instructor, and possibly back again, was generally found not to be any more important than that. The value of the technology seems to be in its ability to reach and not to teach.

Defend the Direction of This Study

To build upon the concepts identified in the review of the literature, and to defend the direction of this study can be best stated by offerings from the text of the study:

> The key to success in distance education is the teacher, and if the teacher is good, the technology, no matter what it is, becomes 'transparent,' but no technology can overcome poor teaching;"[2] . . . and although at the center of the success of a distance education situation the teacher was not always trained to work in that environment. . . . To make teachers successful in the distance education environment they must be prepared in the supplemental skills they need . . .

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[2] Collective quotes and comments from an Office of Technology Assessment Report (1989, p. 18); Moore (1989, pp. 18-19); and Star Schools Grant (1992, p. 24).

therefore training and the provision of those supplemental skills is a necessity, and thus the focus of this research study.

The identification of those strategies which may be important to the success of distance education, was the area of concern in this study. The search to identify the critical strategies for distance education that are perceived as important to the success of distance education, rather than a study of the technologies of distance education, was at the heart of this study. This study was designed to build on the strength of recognized educational strategies utilized in the traditional classroom and identifies those particular strategies that may increase the success of teaching via distance education.

CHAPTER III

METHODOLOGY AND PROCEDURES

This research study was undertaken to identify strategies that instructors and students can use in the distance learning classroom which would help ensure the success of interactive distance education. Moreover, it seeks to establish their importance based on the relationship of the values placed on them between instructors, students, and recognized professionals in distance education. This chapter contains a description of the methodology and procedures used to perform this study. It is divided into the following sections: sample and population, materials and instruments, data collection, research questions, and data analysis.

Sample and Population

The samples for this study were drawn from three sources: (a) recognized professionals in the field of distance education in the State of Iowa, (b) faculty who instruct via distance education from: Kirkwood Community College, Cedar Rapids; Eastern Iowa Community College District, Davenport; Iowa Lakes Community College, Estherville and; Iowa Central Community College, Fort Dodge, and (c) community college students, from the aforementioned institutions, who have received instruction via distance education at either an origination site or a remote site.

Recognized Professionals

The recognized professionals were selected from three sources: (a) a list of professional educators in the state of Iowa who, at the time of selection, were involved in a federally funded Star Schools grant specifically related to activities in distance education; (b) professional educators at community colleges in the state of Iowa who were involved in the administration of distance education facilities and/or the development of programs being offered through distance education; and (c) recommendations by the aforementioned educators. A list of potential participants from the group of professionals, as listed above, were randomly selected, and, after telephone contact, nine volunteered to be included in the study; their names are listed in Appendix E.

Of the nine who volunteered to complete the study, five were involved in some way in the Iowa Star Schools grant, three from two different Regent's institutions and two from the community colleges. The other four were involved in the administration of distance education programs at three of the community colleges. This group, identified from this point on as the "professional panel," were involved not only in the Delphi study, which established the strategies that were used in the survey instrument, but also in the final survey.

Distance Education Faculty

The faculty involved in the study were selected by an administrator at each of the following community colleges: Kirkwood Community College, Cedar Rapids; Eastern Iowa Community College District, Davenport; Iowa Lakes Community College, Estherville and; Iowa Central Community College, Fort Dodge. The faculty were chosen at random from the instructors who were involved in distance education courses at the time of the study, with one delimitation: they would have taught a course or courses over a two-way audio, two-way video interactive system at least two times prior to the survey. It was assumed that since the selection was done during two different semesters and all faculty meeting the delimitations were available for selection, that they were representative of each of the community college's distance education faculty population. The faculty were to respond to the survey instrument and to have their students at both the origination site and the remote site respond to the survey. In all, there were 20 faculty members involved in the study.

Community College Students

The students involved in the study were community college students who, at the time the survey, were in a distance education course either at the origination site or the remote site. Those students at the remote site were involved in instruction being delivered via a two-way audio,

two-way video system. The students were involved in the courses being taught by the instructors who responded to the survey. Of the 247 students responding, 154 were at one of the remote sites with the balance, 93, being at one of the origination sites.

The students in the study were involved in different courses, with different instructors, with different course content. The classes were varied in size, including the number of students at each of the origination and remote sites. And although not selected completely by random, as they were members of a population identified through the selection of their instructors, the assumption was made that the students included in the study were representative of the available student population.

Materials and Instruments

The instrument used in this study was a 100 item survey developed by the researcher. The process of the development of the survey through the subsequent validation is described in the following pages. This section is divided into four parts: (a) the identification of the survey items, the strategies perceived as important to the success of interactive distance education; (b) the development of the instrument; (c) the validation of the instrument; and (d) the research question.

The Identification of the Survey Items

The identification of factors perceived as important to the success of interactive distance education was accomplished through the following: a review of the literature in distance education; discussions with members of the professional panel; discussions with distance education instructors; and researcher observations in the distance education environment. The combined listings were then cross-referenced with a final list of items selected from a review of surveys related to distance education: Denton et al. (1985); Eastern Iowa Community College District Televised Interactive Education evaluation form; Kirkwood Community College Telecommunication System course evaluation form; and the Utah State Educational Telecommunications Operations Center Student System evaluation questionnaire. There was no attempt to catalog how or by whom the items were identified.

Survey Item Categories

The survey items were placed in one of five categories: (a) preparing the participant for system use; (b) organizational aspects of the course; (c) teacher or instructor skills; (d) visualizing course content; and (e) human interaction. The items within each of the categories were supported, in general, by citations from the review of the literature, as delineated in Chapter I. As some of the references fit in more than one category, they were listed in

each category to which they applied. Like items were removed from the consolidated list and the final list of items, as disclosed in the following pages, was established.

Instrument Development

In this section the initial list of 117 survey items are identified within specific categories and supporting literature is cited.

Category 1: Preparing the Participant for System Use

The information gathered through the following references resulted in the development of the survey items which follow the source listings. The topics and sources are: a study related to student attitudes and striving (Atman, 1989); a study to identify variables affecting interaction-learner variables (Burns, 1976); a resource guide for teleclass teaching (Cyrs & Smith, 1990); teaching strategies for distant learning (Hardman, 1993); readings in the study of active student response (Lumsdaine & Glaser, 1960); a study dealing with student responsibility (Nelson, 1985); and a study related to student motivation (Wilkes & Burnham, 1991).

Category 1 includes 9 of the 118 survey items which were included in round one of the Delphi study. These are:

1. Distance education instructors should have special training to teach over interactive television systems.

2. Distance education instructors should have special training in managing instruction over interactive television systems.

3. First-time student participants of distance learning should have a mandatory orientation session to assist them in becoming comfortable with this method of instruction.

4. Students should be made aware of the unique characteristics of distance learning.

5. Students should be introduced to the unique characteristics of interactive television.

6. First-time student participants should be made aware of the degree of student and instructor participation that distance learning requires.

7. Students should have an opportunity to get comfortable interacting with the hardware of distance education before the actual class begins

8. All students, including those at the origination site, should be made aware of the need to identify themselves when interacting over the system.

9. An action plan for recovery should be established if the class must be temporarily interrupted or canceled due to technical problems or inclement weather.

Category 2: Organization

The information gathered through the following references resulted in the development of the survey items which follow the source listings. The sources are:

identification of necessary teaching skills (Boone & Bassett, 1983); a study to identify variables affecting interaction-environmental variables (Burns, 1976); a study to measure student attitudes (Biner, 1993); telelesson plan; interaction; teleclass teaching; maximizing (Cyrs & Smith, 1990); identification of necessary teaching behaviors (Haaland & Newby, 1984); teaching strategies for distant learning (Hardman, 1993); a study related to feedback types and uses (Howard, 1989); the study of feedback in form of quizzes (Hoyle, 1988); readings in study of feedback and reinforcement (Lumsdaine & Glaser, 1960); survey item, behavior (Rezabek, 1988); and identification of necessary teaching behaviors (Schaeffer & Roel, 1985).

Category 2 includes 33 of the 118 survey items which were included in round one of the Delphi study. These are:

10. Course requirements should be clearly stated.

11. Course goals and objectives should be clearly communicated.

12. Performance objectives should be specified and clearly communicated.

13. Use of a study guide or enhanced syllabus, a master plan for the course, which supports the semi-independent learning of the students should be required.

14. The study guide or enhanced syllabus for the course should guide and direct the student's attention to what is expected to be learned.

15. The study guide or enhanced syllabus should be used to minimize the need for note copying and focus attention on the key concepts of the class session.

16. The study guide or enhanced syllabus should explain and or define new terms and concepts.

17. The course should be presented in an organized way

18. The course should be presented in a logical way

19. The organization of the course, such as the daily class schedule, should be clearly identified.

20. Learning objectives should be introduced at each class session.

21. Learning objectives for each class session should be able to be met.

22. Each class session should begin with a review of the previous class session.

23. Focus of the class presentation should be on important points of the course objectives.

24. All instructional activities and various programs should be relevant to the course objectives.

25. Each class session should conclude with a summary of the days lessons.

26. Instructor and student material exchange such as hand outs, test results and papers should be timely.

27. Material exchange between instructor and student should be handled the same at all sites including the origination site.

28. Material exchange between instructor and student should occur at each site at the same time.

29. Material exchange between instructor and student should be easy.

30. Systematic formative feedback such as quarterly, mid-term and end-of-term examinations should be given.

31. Systematic corrective feedback and positive reinforcement should be given.

32. Policies related to such items as student behavior and attendance should be clearly identified.

33. Overall student behavior at all sites should be maintained at the same level.

34. Conversation level in the distance classroom should be kept at a level which does not affect the ability of the students to pay attention to the instructor at the origination site.

35. Ground rules for asking and answering questions should be clarified and set.

36. The students should have access to the instructor outside of the classroom.

37. There should be site support via site facilitators.

38. Site facilitators should be in each distance classroom throughout the entire class period.

39. Faculty and student access to the site facilitator should be easy.

40. Site facilitator should be knowledgeable, on time, and always present.

41. The classroom environment should be conducive to learning and look like a classroom.

42. The classroom environment should be designed to accommodate the special needs of distance learning.

Category 3: Teacher or Instructor Skills

The information gathered through the following references resulted in the development of the survey items which follow the source listings. The sources are: a study related to student perceptions of weaknesses, including lack of teacher training (Barker, 1988); a study in measurement of student attitudes (Biner, 1993); a study that identified necessary instructor skills (Boone & Bassett, 1983); research related to effective teaching behaviors (Braucher, 1983); distance learning teacher skills (Bronstein et al., 1982); identification of teleclass teaching skills (Cyrs & Smith, 1990); necessary teaching behaviors (Haaland & Newby, 1984); identification of teaching strategies for distant learning (Hardman, 1993); readings in study of feedback and reinforcement (Lumsdaine & Glaser, 1960); on delivery of information (Rezabek, 1988); and necessary teaching behaviors for the distance classroom (Schaeffer & Roel, 1985).

Category 3 includes 33 of the 118 survey items which were included in round one of the Delphi study. These are:

43. The instructor should be aware that the distance learning environment is unique and requires the instructor to think visually.

44. The instructor should consider the medium of delivery, television for the distance sites, and its potential to affect the dynamics of instruction.

45. The instructor should allow consideration for the delivery of the medium and its potential effect on the design of the course.

46. The instructor should be able to utilize the unique attributes of the medium to produce efficiency in instruction.

47. The instructor should be aware of the need for student involvement, in the form of interaction, that distance learning requires.

48. The instructor should be aware that the distance learner is unique and must understand the needs and motivations of the distance learner.

49. Personal qualities of the instructor should include such as personality and poise.

50. Instructor qualities should include vitality and enthusiasm for teaching.

51. The instructor should have knowledge of and use the unique communication skills needed in the interactive classroom.

52. The instructor should be aware that the distance learning environment is unique and requires the instructor to maximize interaction between student and teacher.

53. The instructor should have enthusiasm for teaching the subject that he or she is teaching and that enthusiasm should permeate everything he or she does in the classroom.

54. Flexibility should be a needed quality of the instructor.

55. The instructor should express a positive attitude.

56. Creativity should be a needed quality of the instructor.

57. A high self-esteem should be expressed by the instructor.

58. The instructor should be able to work with the interactive television system in such a way that he or she is presented as being in-charge of the technology and not overwhelmed by it.

59. The instructor should have the ability to work with the technology as a dynamic tool to enhance the instructional process.

60. The instructor should be aware that the delivery of instruction should include such things as posture and body language.

61. The instructor should be aware of the overt feedback revealed through facial or physical expression displayed through the medium of television.

62. The instructor should establish and maintain eye contact with students while talking and listening to them no matter their location.

63. The interactive system enables the instructor to see and respond to the students at all sites therefore the instructor should maintain a high level of critical feedback.

64. The instructor should express the same level of rapport with the students at the distant sites as with those at the origination site.

65. The instructor should show awareness of students at the remote sites.

66. The instructor should emphasize the need for interaction with participants at the remote sites to ensure their participation.

67. The instructor should emphasize how easy participation is by emphasizing activities which generate interaction with and between instructor and students at all sites.

68. The instructor should purposefully act to integrate and synthesize classroom activities at all sites.

69. The instructor should actively stimulate discussion at all sites.

70. The instructor should encourage all students to become involved in class activities at all sites.

71. The instructor should make at least one visit to the remote sites.

72. On occasion the instructor should generate the class from a remote site instead of the normal origination site.

73. Access to the instructor should be available at times other than during normal classroom time.

74. Face to face access to the instructor should be available outside of normal classroom hours.

75. Office hours via telephone access to the instructor should be available.

Category 4: Visualizing Course Content

The information gathered through the following references resulted in the development of the survey items which follow the source listings. The sources are: a study to identify variables affecting interaction-media variables (Burns, 1976); on the telelesson plan (Cyrs & Smith, 1990); on teaching strategies for distant learning (Hardman, 1993); study related to creativity (Heinzen & Alberico, 1990); and on preparing graphics (Rezabek, 1988).

Category 4 includes 10 of the 118 survey items which were included in round one of the Delphi study. These are:

76. The instructor should use visual aids when applicable to enhance and explain course content.

77. The instructor should use visual illustrations to enhance and explain course content.

78. Media, methods, and materials should fit the objectives.

79. The instructor should use the many learning alternatives, media, methods and materials, which best meet the learning requirements of the students.

80. The instructor should use demonstration when applicable.

81. Visual aids should be backed up with handouts.

82. Prepared visual materials should be of high quality.

83. Prepared visual materials should be specifically applicable to the instruction being given.

84. Visual materials should be left on screen long enough for the student to absorb and take notes.

85. Visual materials utilized should be used to enhance instruction and not as lecture notes.

Category 5: Human Interaction

The information gathered through the following references resulted in the development of the survey items which follow the source listings. The sources are: study in identify necessary skills (Boone & Bassett, 1983); research related to effective teaching behaviors (Braucher, 1983); a study related to teacher skills (Bronstein et al., 1982); on maximizing interaction; on classroom questioning strategies (Cyrs & Smith, 1990); on teaching strategies for distant learning (Hardman, 1993); a study related to feedback types, uses (Howard, 1989); and on system evaluation (Rezabek, 1988).

Category 5 includes 32 of the 118 survey items which were included in round one of the Delphi study. These are:

86. The instructor should acknowledge that there is a difference between students watching instruction and participating in it.

87. The instructor should explain the difference between watching and participating in instruction and emphasize the value of participation.

88. The student should acknowledge the difference between watching instruction and participating in it and practices participating in the instruction.

89. The instructor should manipulate the medium to effectively use its unique attributes to induce student interaction.

90. Students at all the sites should be involved in activities enabling them to get acquainted.

91. Students at all sites should have rosters of the students at all of the other sites for identification purposes and to enhance interaction.

92. The students at each site should verbally sign on by introducing themselves at the beginning of each class session.

93. The students at each site should verbally identify themselves and give their location each time they speak.

94. The instructor should use site location to identify student name, as in "Cindy in Worthington."

95. The instructor should know students names at all sites and use them.

96. All students should have the opportunity to hear and respond to the instructor.

97. All students should have the opportunity to hear and respond to the students at all of the other sites.

98. Any feedback from the instructor should be timely.

99. Feedback from the instructor should be in the form of positive reinforcement.

100. There should be a considerable amount of interaction between student and instructor.

101. Students should have the opportunity to interact with the instructor during class instruction.

102. There should be an opportunity for interaction between students at all sites during class instruction.

103. Interaction and participation from a remote location should be easy.

104. There should be an emphasis on learner activities, exercises, and projects involving student-student interaction.

105. There should be optional study sessions available at all sites.

106. Optional study sessions with the instructor or an aide via television should be available at all sites via the interactive system.

107. There should be off-class time opportunity for students to interact with students at other sites.

108. Students should have an opportunity to get to know the students at the other sites.

109. Interaction at a distant site should be no more difficult than at the origination site.

110. There should be some type of activity which brings together class members from all sites.

111. There should be planned social activities for students at all sites.

112. Instruction should be performance and involvement oriented.

113. Instruction should be designed to maximize student interaction through class discussion.

114. Group dynamics should be maximized through formalized discussion sessions among students across sites.

115. To maximize interaction among all sites a process for shared student responses should be implemented.

116. Student peer support should be created and fostered.

117. Student interaction should be maximized through peer teaching.

The Delphi Study

Delphi Round One

The completed instrument for the professional panel

consisted of 117 items. The professional panel members were asked to respond to each survey item by rating it on a 4 point Likert scale with 1 being "not important" and 4 being "highly important" to the success of distance learning.

The survey was carried out using a modified Delphi technique. The modification, in this study, consisted of compressing the typical four rounds into two, based on Borg and Gall (1983), who report that:

> Although the variability of responses tends to decrease from round to round, the mean responses tend to shift very little. Thus, a single mailing of the questionnaire probably produces as good descriptive data as the four mailings required in a Delphi study. (p. 414)

The responses of the Professional Panel were processed and the data analyzed. Those survey items with a mean value of less than 2.5 were dropped from the next round in the Delphi. The outcome indicated 10 items be dropped (see Appendix B).

Delphi Round Two

In the second round of the Delphi the survey contained a list of 107 items. As in the first round Delphi, the professional panel was asked to respond to the survey items by rating them on a 4 point Likert scale with 1 being "not important" and 4 being "highly important" to the success of distance learning.

The responses of the Professional Panel to the second round of the Delphi were processed and the data analyzed. The items with a mean value of less than 2.5 were dropped (see Appendix C) from the survey (G. P. Stefanich, personal communication, April 3, 1993), with the final version of the survey containing 99 items.

Validation of the Survey

One class was randomly selected, from a pool of classes in the defined population, to validate the survey by running a pilot study. No changes in the study occurred through this validation.

Data Collection

The data collection for this survey was accomplished in two stages. In Stage One administrators involved in distance education at each of the community colleges were contacted to facilitate the distribution of the surveys. Instructions for receipt, distribution and return of the survey instruments were supplied to the administrators either by telephone, in person, or by mail. The distribution was as follows:

1. The survey instruments were sent to each member of the Professional Panel. The responses to the survey items were made on an NCS answer sheet. Nine distance education professionals agreed to respond to the surveys.

2. The survey instruments were sent to randomly selected instructors teaching via distance learning through a

distance education administrator at each of the specified community colleges. The responses to the survey items were made on an NCS answer sheet. Twenty faculty members who were teaching classes via distance education participated in the survey.

3. The survey instruments were sent to students involved in a distance education program through the faculty members participating in the survey who were teaching their classes. The responses to the survey items were made on an NCS answer sheet. The number of students who could have participated in the survey is unknown, but as the survey was at the request of their instructor it was assumed the return was close to 100%.

In Stage Two of the data collection the survey computer scan sheets were collected by the distance education administrator and returned to the researcher. The returned surveys were opened by a second party, given a record number and passed on to the researcher for analysis without the researcher knowing the source of the surveys. The return was as follows:

1. Of the survey instruments sent to the Professional Panel nine were returned.

2. Twenty faculty members responded to the survey.

3. Two hundred and forty-seven students responded to the survey. Of the 247 students who responded 93 were

located at the origination site while the balance of 154 students were located at remote sites.

Collection of the data was accomplished over a two semester, one year time frame, due mainly to semester scheduling differences between the community colleges. There was no effort to analyze any of the data until all survey instruments were collected. The completed surveys were processed (scanned) and the raw data recorded at Information Systems and Computing Services at The University of Northern Iowa where it was placed in a file on the university's main frame computer to allow access for data analysis.

Research Questions

In regard to the data collected from the four groups the following research questions were asked:

2. What is the extent of agreement, regarding factors deemed to be important to the success of distance education between: a professional panel, instructors who have taught or are teaching via distance education, students who have participated in distance education at the origination site and, students who have participated in distance education at a distant site?

3. What factors have been observed that are considered as being desirable to the success of distance education by: a panel of professionals in distance education, instructors who have taught or are teaching via distance education, students who have participated in distance education at the

origination site, and students who have participated in distance education at a distant site?

4. What factors have been observed that are considered as being undesirable to the success of distance education by: a panel of professionals in distance education; instructors who have taught or are teaching via distance education; students who have participated in distance education at the origination site; and students who have participated in distance education at a distant site?

The data collected was tested through two statistical techniques: the Kruskal-Wallis H Test, and the Mann-Whitney U test. The Statistical Package for the Social Sciences, SPSS, was used for data analysis.

The Kruskal-Wallis H Test was selected as the first test of the data (A. R. Gilpin, personal communication, March 7, 1995), as: (a) there are three or more independent groups, four in this study and, (b) the data consists of numerical ranks. The Kruskal-Wallis H Test is defined by Witte (1989):

> When original observations are numerical ranks . . . there is no basis for speculating about whether the underlying populations are normally distributed with equal variances . . . it is advisable to use a test such as the Kruskal-Wallis H Test, which retains its accuracy even though these assumptions might be violated. (p. 384)

The level of significance was set at .05. The test was used to indicate significant differences among the groups. Those survey items that were identified at <.05 level were further

analyzed through the Mann-Whitney U test to determine differences between the groups and reduce the probability of a Type I error.

The use of the Mann-Whitney U test, in this case is supported by Witte (1989):

> When the sample sizes are small . . . violations of the normality assumption could be seriously impaired . . . causing the probability of a Type I error . . . one remedy is to . . . analyze ranked data with the Mann-Whitney U test for two independent samples. As is true of all tests for ranked data, the U test is immune to violations of assumptions about normality and equal variances. (p. 374)

The test was run to determine whether the distributions of scores of two independent samples differed significantly from each other. The groups in the study were identified as follows: the professional panel members by a "1," the faculty by "2," the students at the origination site as "3," and the students at the remote sites with a "4."

The groupings, 1 and 2, 1 and 3, 1 and 4, 2 and 3, 2 and 4, 3 and 4, were analyzed using the Mann-Whitney U test and conducted as follows: (a) 1 and 2, the professional panel data and the faculty data; (b) 1 and 3, the professional panel data and the students at the origination sites data; (c) 1 and 4, the professional panel data and the students at the remote sites data; (d) 2 and 3, the faculty data and the students at origination sites data; (e) 2 and 4, faculty data and student at remote site data; and (f) 3 and 4, student at

origination site data and student at remote site data. The level of significance was set at .05.

A write-in activity was added to the end of each survey, to allow participants to comment, based on their experiences, on what they felt was desirable and undesirable in the distance education classroom. The write-in responses were compiled in an attempt to analyze responses in a qualitative manner.

CHAPTER IV

PRESENTATION OF THE DATA

Research Questions

This chapter is written to present the findings of this research. The chapter is divided into three sections: the first section is related to Research Question I and describes the statistical process and rationale behind the selection of the items used in the survey instrument; the second section is in response to Research Question II and includes the report and interpretation of results of the statistical tests on the survey instrument; and, Research Questions III and IV are covered in the third section in which the results of the informal questions gathered at the end of the survey instrument are reported and interpreted.

Research Question I

Which factors are perceived as being important to the success of distance education by a professional panel with distance education experience?

A Delphi study was used to determine which items to include in the survey. The Delphi was run in a two-step process with the participants, "professional panel members," responding through a 4 point Likert scale with 1 being "not important" and 4 being "highly important." A mean was determined for each survey item and any items with a mean of less than 2.5 were dropped.

In the first round of the Delphi study the survey contained a list of 117 items (see Appendix B). The professional panel members were asked to respond to the survey items by rating them on a 4 point Likert scale with 1 being "not important" and 4 being "highly important" to the success of distance learning. They were also asked to add any additional items they thought were appropriate.

The responses of the Professional Panel to the first round of the Delphi were processed and the data analyzed. Survey items with a mean of less than 2.5 were dropped from the second round of the Delphi. (The results of the first round of the Delphi are located in Appendix B, Frequency Table). The items to be dropped are indicated by a double asterisk preceding the item number.

The results of this test identified 10 of the 117 items with a mean of less than 2.5. Survey items 6, 22, 25, 38, 49, 57, 92, 105, 107, and 108 all had a mean less than 2.5 and were identified to be dropped from the next round of the Delphi. The balance of 107 items established the survey items in the second round of the Delphi study.

In the second round of the Delphi study the survey contained a list of 107 items (see Appendix C). As in the first round of the Delphi study, the professional panel was asked to respond to the survey items by rating them on a 4 point Likert scale with 1 being "not important" and 4 being "highly important" to the success of distance learning.

The responses of the Professional Panel to the second round of the Delphi were processed and the data analyzed. Those items having a mean of less than 2.5 were dropped off the survey. The results of this test identified 8 of the 107 items with a mean of less than 2.5, survey items 3, 6, 7, 68, 82, 100, 101, and 107 (see Appendix C, Frequency Table). The description of data collection and analysis of the survey instrument is described in the following pages.

Research Question II

What is the extent of agreement, regarding factors deemed to be important to the success of distance education, between: a professional panel, instructors who have taught or are teaching via distance education, students who have participated in distance education at the origination site, and students who have participated in distance education at a distant site?

The survey instruments were sent to each member of the Professional Panel, randomly selected instructors teaching via distance learning, and students in their classes. Twenty faculty members who were teaching classes via distance education and 247 of their students, 93 of which were located at the origination site with 154 students located at remote sites, took part in the survey.

The completed surveys were processed (scanned) and the raw data recorded. The Kruskal-Wallis H Test was selected as the first test of the data as there were more than two

independent groups in this study and the original observations consisted of numerical ranks.

This test was conducted on the results of the survey instrument to determine whether there were significant differences in the responses of the four participant groups to each of the 99 items in the survey instrument. Interpretation of the results of the Kruskal-Wallace H Test indicated 10 of the 99 items showed significant differences in the participants' responses at the <.05 level as shown in Table 1 (these are labeled by a double asterisk preceding the Item No.). An encapsulated interpretation of the findings for items no. 9, 10, 12, 31, 40. 46. 47, 56, 80, and 85 from the Kruskal-Wallace H Test follow in Tables 2, 4, 6, 8, 10, 12, 14, 16, 18, and 20.

Table 1

Interpretation of the Kruskal-Wallace H Test

Item No.	n	z^2	p
1	276	.1479	.1955
2	276	.3846	.9506
3	276	1.9376	.5854

(table continues)

Item No.	n	z^2	p
4	276	2.8016	.4232
5	276	2.1831	.5442
6	276	3.6085	.3070
7	276	2.8767	.4110
8	276	3.4979	.3210
**9	276	13.7336	.0033
**10	276	8.6750	.0339
11	276	7.2448	.0645
**12	276	10.4887	.0148
13	276	1.6897	.6392
14	276	4.9145	.1782
15	276	2.0683	.5584
16	276	.3482	.9507
17	276	6.0548	.1090
18	276	1.9012	.5932
19	276	1.2512	.7408
20	276	5.8152	.1210
21	276	3.0825	.3791
22	276	.8156	.8457
23	276	1.3414	.7193
24	276	2.4553	.4834
25	276	5.1275	.1627

(table continues)

Item No.	n	z^2	p
26	276	4.5436	.2084
27	276	2.0232	.5676
28	276	5.0730	.1665
29	276	1.5682	.6666
30	276	2.1238	.5471
*31	276	19.4491	.0002
32	276	2.2179	.5284
33	276	3.8346	.2799
34	276	2.0626	.5595
35	276	6.4172	.0930
36	276	3.9250	.2697
37	276	.3096	.9582
38	276	1.2903	.7314
39	276	3.1442	.3699
*40	276	9.0314	.0289
41	276	4.3126	.2296
42	276	2.8701	.4121
43	276	2.0571	.5606
44	276	.2240	.9736
45	276	2.3470	.5036
*46	276	10.3178	.0160
*47	276	7.5673	.0459

(table continues)

Item No.	n	z^2	p
48	276	1.6070	.6578
49	276	1.3887	.7082
50	276	.7590	.8593
51	276	1.9347	.5861
52	276	2.6324	.4518
53	276	6.8305	.0775
54	276	2.1681	.5383
55	276	1.5776	.6645
*56	276	7.7888	.0496
57	276	1.7630	.6230
58	276	1.9553	.5817
59	276	.6818	.8775
60	276	.4732	.9247
61	276	3.6722	.2991
62	276	6.3450	.0960
63	276	4.2879	.2320
64	276	1.8550	.6031
65	276	2.3712	.4990
66	276	4.3379	.2272
67	276	1.5878	.6622
68	276	.2393	.9710
69	276	1.4038	.7046

(table continues)

Item No.	n	z^2	p
70	276	3.2040	.3612
71	276	7.3159	.0625
72	276	3.7408	.2908
73	276	4.4364	.2180
74	276	1.9029	.5928
75	276	1.3573	.7156
76	276	2.5162	.4724
77	276	1.0657	.7854
78	276	4.4881	.2134
79	276	5.3288	.1492
*80	276	8.8881	.0308
81	276	2.3098	.5106
82	276	1.3068	.7275
83	276	1.5578	.6690
84	276	4.6904	.1959
*85	276	12.5218	.0058
86	276	.2162	.9749
87	276	1.5329	.6747
88	276	1.3719	.7121
89	276	4.7811	.1885
90	276	3.8340	.2800
91	276	1.0358	.7926

(table continues)

Item No.	n	z^2	p
92	276	4.2966	.2312
93	276	3.6928	.2966
94	276	2.1393	.5440
95	276	1.1858	.7564
96	276	6.6940	.0823
97	276	1.2254	.7469
98	276	1.3139	.7258
99	276	3.8495	.2782

To further interpret the findings of The Kruskal-Wallis H Test those survey items identified as significantly different at the <.05 level were further analyzed through the Mann-Whitney U Test. The Mann-Whitney U Test, was used here to reduce the probability of a Type I error, as it is immune to violations of assumptions about normality and equal variances.

The Mann-Whitney U Test was utilized to determine whether the distributions of scores of two independent samples differed significantly from each other, and was conducted with the groups as follows : (a) 1 and 2, students at origination site and students at remote sites; (b) 1 and

3, students at the origination site and faculty; (c) 1 and 4, students at the origination site and professional panel; (d) 2 and 3, faculty and students at remote sites; (e) 2 and 4, students at remote sites and professional panel; and (f) 3 and 4, faculty and professional panel (A. R. Gilpin, personal communication, March 7, 1995). The level of significance was set at the <.05 level. An encapsulated interpretation of the findings for items no. 9, 10, 12, 31, 40. 46. 47, 56, 80, and 85 from the Mann-Whitney U Test, follow in Tables 3, 5, 7, 9, 11, 13, 15, 17, 19, and 21.

Results of The Kruskal-Wallis H Test on Item No. 9

The mean rank for the faculty, established at 101.40, as compared to 151.58 by the students at the remote sites suggest that the faculty placed less importance on the enhanced syllabus or study guide. The professional panel and the students at the origination site responded most closely, with mean ranks of 128.78 and 125.76, respectively, and fell between the responses of the other two groups. This finding, in the disparities between the mean ranks, suggests that the perception of the importance of the syllabus by the faculty is different from the other groups in the study.

Table 2

Kruskal-Wallace H Test on Item No. 9

Use of a study guide or enhanced syllabus, a master plan for the course, which supports the semi-independent learning of the students should be required.

Mean Rank	Cases		Group
125.76	93	1	student at origination site
151.58	154	2	student at remote site
101.40	20	3	faculty
128.78	9	4	professional panel
	n = 276		

		Corrected for ties	
Chi-Square	Significance	Chi-Square	Significance
10.9566	.0120	13.7336	.0033

Results of The Mann-Whitney U Test on Item No. 9

Analysis of the Mann-Whitney Test indicates support for the results suggested by the findings in The Kruskal-Wallace Test. The findings show differences between the responses of the students at the remote sites, the students at the origination site and the faculty. This difference is

supported by indicated p values of .0053 and .0029 respectively.

Table 3

Mann-Whitney U Test on Item No. 9

Mean Rank	Cases	Group			
109.54	93	1	student at origination site		
132.73	154	2	student at remote site		
Total	247			Corrected for ties	
	U		W	Z	2-Tailed P
	5816.0		10187.0	-2.7855	.0053
58.81	3	1	student at origination site		
48.58	20	3	faculty		
Total	113			Corrected for ties	
	U		W	Z	2-Tailed P
	761.5		971.5	-1.4155	.1569
51.41	93	1	student at origination site		
52.39	9	4	professional panel		
Total	102			Corrected for ties	

(table continues)

Mean Rank				Cases Group
U	W	Z	2-Tailed P	
410.5	471.5	-.1052	.9162	
91.11	154	2	student at remote site	
59.70	20	3	faculty	
Total	174		Corrected for ties	
U	W	Z	2-Tailed P	
984.0	1194.0	-2.9810	.0029	
82.73	154	2	student at remote site	
69.44	9	4	professional panel	
Total	163		Corrected for ties	
U	W	Z	2-Tailed P	
580.0	625.0	-.9462	.3440	
14.13	20	3	faculty	
16.94	9	4	professional panel	
Total	29		Corrected for ties	
U	W	Exact 2-Tailed P	Z	2-Tailed P
72.5	152.5	.4165	-.9220	.3565

Results of The Kruskal-Wallis H Test on Item No. 10

As in item 9 the faculty, again, show a divergence from the other groups. In this case, the panel along with the students at the remote sites responded much the same to an enhanced study guide, with mean ranks of 148.54 and 136.50. The faculty differed with a mean rank of 107.63. This finding, supported by the findings of Item No. 9, suggests a dichotomy between the responses of both student groups and the professional panel members, and the perceptions of the faculty.

Table 4

Kruskal-Wallace H Test on Item No. 10

The study guide or enhanced syllabus for the course should guide and direct the student's attention to what is expected to be learned.

Mean Rank	Cases	Group	
128.71	93	1	student at origination site
148.54	154	2	student at remote site
107.63	20	3	faculty
136.50	9	4	professional panel

(table continues)

Mean Rank	Cases	Group	
	n = 276		
		Corrected for ties	
Chi-Square	Significance	Chi-Square	Significance
6.8334	.0774	8.6750	.0339

Results of The Mann-Whitney U Test on Item No. 10

These findings were almost a mirror image of Item 9. There is an indicated relationship between the findings in both the Kruskal-Wallace and Mann-Whitney tests. Both tests show different perceptions between the faculty and the students at the remote sites. The most significant p value, p = .0153, was found between the faculty and the students at the remote sites. The strongest relationship was between the panel and the students at the origination site with p = .7341. The two student groups were at p = .0336. The findings suggest that the faculty's perceived importance of an enhanced syllabus is different than that of the students.

Table 5

Mann-Whitney U Test on Item No. 10

Mean Rank	Cases	Group		
112.98	93	1 student at origination site		
130.65	154	2 student at remote site		
Total	247		Corrected for ties	
	U	W	Z	2-Tailed P
	6136.5	10507.5	-2.1243	.0336
58.50	93	1 student at origination site		
50.03	20	3 faculty		
Total	113	Corrected for ties		
	U	W	Z	2-Tailed P
	790.5	1000.5	-1.1916	.2334
51.23	93	1 student at origination site		
54.33	9	4 professional panel		
Total	102		Corrected for ties	
	U	W	Z	2-Tailed P
	393.0	489.0	-.3396	.7341

(table continues)

Mean Rank	Cases		Group		
90.47	154	2	student at remote site		
64.60	20	3	faculty		
Total	174			Corrected for ties	
	U		W	Z	2-Tailed P
	1082.0		1292.0	-2.4496	.0143
82.41	154	2	student at remote site		
74.94	9	4	professional panel		
Total	163			Corrected for ties	
	U		W	Z	2-Tailed P
	629.		674.5	-.5274	.5979
14.00	20	3	faculty		
17.22	9	4	professional panel		
Total	29		Exact	Corrected for ties	
U	W		2-Tailed P	Z	2-Tailed P
70.0	155.0		.3648	-1.1353	.2563

Results of The Kruskal-Wallis H Test on Item No. 12

The following table contains findings that continue to follow the trend identified in Tables 2 through 5. Items 9

and 10 were perceived differently by the faculty in comparison to the other groups (as indicated in differences in mean ranks). The faculty response, to Item No. 12, is again the lowest mean rank at 109.20. This is compared to the next highest mean rank which is 130.60 (students at the remote sites). The professional panel and the students at the origination site had mean ranks of 143.17 and 157.44 respectively. The trend of the groups somewhat followed their previous responses, with a slight change between the panel and the students at the origination site, rather than the previous alignment between panel and students at the remote sites.

Table 6

Kruskal-Wallace H Test on Item 12

The study guide or enhanced syllabus should explain and or define new terms and concepts.

Mean Rank	Cases	Group	
157.44	93	1	student at origination site
130.60	154	2	student at remote site
109.20	20	3	faculty
143.17	9	4	professional panel

(table continues)

Mean Rank	Cases	Group	
	n = 276		
		Corrected for ties	
Chi-Square	Significance	Chi-Square	Significance
9.4693	.0237	10.4877	.0148

Results of The Mann-Whitney U Test on Item No. 12

A division is indicated in the responses between the students at the origination sites and the students at the remote sites, with a p value at .0061. This difference had not been indicated in the previous tables. The students at the origination sites and the students at the remote sites also indicated lower mean ranks in respect to the faculty with values of .0162 and .1914. The p values between the professional panel, and the students at the origination and remote sites, p = .5562 and p = .6092 respectively, would suggest agreement in their responses to Item No. 12.

Table 7

Mann-Whitney U Test on Item No 12

Mean Rank	Cases	Group	
139.20	93	1	student at origination site
114.82	154	2	student at remote site
Total	247		Corrected for ties
U	W	Z	2-Tailed P
5747.5	12945.5	-2.7412	.0061
60.24	93	1	student at origination site
41.95	20	3	faculty
Total	113		Corrected for ties
U	W	Z	2-Tailed P
629.0	839.0	-2.4047	.0162
52.00	93	1	student at origination site
46.33	9	4	professional panel
Total	102		Corrected for ties
U	W	Z	2-Tailed P
372.0	417.0	-.5884	.5562

(table continues)

Mean Rank	Cases		Group
89.21	154	2	student at remote site
74.35	20	3	faculty
Total	174		

	Corrected for ties	
U	W	Z	2-Tailed P
1277.0	1487.0	-1.3063	.1914

81.57	154	2	student at remote site
89.39	9	4	professional panel
Total	163		

	Corrected for ties	
U	W	Z	2-Tailed P
626.5	804.5	-.5113	.6092

13.90	20	3	faculty
17.44	9	4	professional panel
Total	29		

Exact		Corrected for ties	
U	W	2-Tailed P	Z	2-Tailed P
68.0	157.0	.3171	-1.0830	.2788

Results of The Kruskal-Wallis H Test on Item No. 31

The perceived need for site facilitators is different between the professional panel and the other groups. The

professional panel had a mean rank of 39.83 compared to the students at the origination sites with a mean rank of 141.63, the students at the remote sites with a mean rank of 141.72, and the faculty with the highest mean rank of 143.52.

Table 8

Kruskal-Wallace H Test on Item 31

There should be site support via site facilitators.

Mean Rank	Cases		Group
141.63	93	1	student at origination site
141.72	154	2	student at remote site
143.52	20	3	faculty
39.83	9	4	professional panel
	n = 276		

		Corrected for ties	
Chi-Square	Significance	Chi-Square	Significance
14.2257	.0026	19.4491	.0002

Results of The Mann-Whitney U Test on Item No. 31

The findings suggested by the p values indicated in Table 11 show close responses between the faculty and students at the origination sites and the students at the remote sites. The student paired group responses, indicated by a p value of .9930, were closely related to those of the two student groups when paired with the faculty at p values of .9110 and .9120. When pairing each student group with the professional panel, p values were .0000 for each group. The professional panel and faculty showed an indicated p value of .0005.

Table 9

Mann-Whitney U Test on Item No. 31

Mean Rank	Cases	Group			
123.96	93	1	student at origination site		
124.03	154	2	student at remote site		
Total	247			Corrected for ties	
	U		W	Z	2-Tailed P
	7157.0		11528.0	-.0087	.9930

(table continues)

Mean Rank	Cases	Group	
56.87	93	1	student at origination site
57.63	20	3	faculty
Total	113		Corrected for ties
	U	W	Z 2-Tailed P
	917.5	1152.5	-.1118 .9110
54.81	93	1	student at origination site
17.28	9	4	professional panel
Total	102		Corrected for ties
	U	W	Z 2-Tailed P
	110.5	155.5	-4.1478 .0000
87.37	154	2	student at remote site
88.47	20	3	faculty
Total`	174		Corrected for ties
	U	W	Z 2-Tailed P
	1520.5	1769.5	-.1093 .9129
85.32	154	2	student at remote site
25.17	9	4	professional panel
Total	163		Corrected for ties
	U	W	Z 2-Tailed P
	181.5	226.5	-4.3006 .0000

(table continues)

Mean Rank	Cases	Group		
18.42	20	3 faculty		
7.39	9	4 professional panel		
Total	29	Exact		Corrected for ties
Mean Rank	Cases	Group		
U	W	2-Tailed P	Z	2-Tailed P
21.5	66.5	.0006	-3.4949	.0005

Results of The Kruskal-Wallis H Test on Item No. 40

The students at the origination site had an indicated mean rank score of 123.61 as compared to the professional panel with a mean rank of 182.61. The faculty had a mean rank of 153.00 and the students at the remote sites had a mean rank of 143.03. The professional panel, with the highest mean rank score, placed the most value on the instructor being aware of the need for interaction in the distance classroom. This was followed, in rank order, by the faculty, the students at the remote sites, and the students at the origination sites.

Table 10

Kruskal-Wallace H Test on Item No. 40

The instructor should be aware of the need for student involvement, in the form of interaction, that distance learning requires.

Mean Rank	Cases		Group
123.61	93	1	student at origination site
143.03	154	2	student at remote site
153.00	20	3	faculty
182.61	9	4	professional panel
	n = 276		

		Corrected for ties	
Chi-Square	Significance	Chi-Square	Significance
7.1428	.0675	9.0314	.0289

Results of The Mann-Whitney U Test on Item No. 40

The findings here, as in the Kruskal-Wallace H Test, suggest differences between the responses of the students at the remote sites and the students at the origination site. The data generated indicated p values of .0169 between the students at the origination sites and the professional panel; and the students at the origination sites and the students at

the remote sites at .0387. The students at the remote sites, although not at the same level of significance, did show the next lowest p level at .0837 when paired with the faculty. The students at the origination sites and the professional panel were at .1056.

Table 11

Mann-Whitney U Test on Item No. 40

Mean Rank	Cases	Group			
113.22	93	1	student at origination site		
130.51	154	2	student at remote site		
Total	247			Corrected for ties	
	U		W	Z	2-Tailed P
	6158.5		10529.5	-2.0669	.0387
54.82	93	1	student at origination site		
67.15	20	3	faculty		
Total	113			Corrected for ties	
	U		W	Z	2-Tailed P
	727.0		1343.0	-1.7299	.0837

(table continues)

Mean Rank	Cases		Group		
49.57	93	1	student at origination site		
71.44	9	4	professional panel		
Total	102			Corrected for ties	
	U		W	Z	2-Tailed P
	239.0		643.0	-2.3881	.0169
86.80	154	2	student at remote site		
92.88	20	3	faculty		
Total	174			Corrected for ties	
	U		W	Z	2-Tailed P
	1432.5		1857.5	-.5733	.5664
80.72	154	2	student at remote site		
103.89	9	4	professional panel		
Total	163			Corrected for ties	
	U		W	Z	2-Tailed P
	496.0		935.0	-1.6183	.1056
13.98	20	3	faculty		
17.28	9	4	professional panel		
Total	29		Exact	Corrected for ties	

(table continues)

Mean Rank	Cases	Group		
U	W	2-Tailed P	Z	2-Tailed P
69.5	155.5	.3404	-1.1492	.2505

Results of The Kruskal-Wallis H Test on Item No. 46

The responses of the professional panel were indicated by a mean rank of 187.28, followed by the faculty with a mean rank of 158.35. The student responses were below that of the professional panel. The students at the origination site generated a mean rank of 142.23 while the students at the remote sites had a mean rank of 123.33.

Table 12

Kruskal-Wallace H Test on Item 46

Flexibility should be a needed quality of the instructor.

Mean Rank	Cases	Group	
123.33	93	1	student at origination site
142.23	154	2	student at remote site

(table continues)

Mean Rank	Cases		Group
158.35	20	3	faculty
187.28	9	4	professional panel
	n = 276		

		Corrected for ties	
Chi-Square	Significance	Chi-Square	Significance
8.2952	.0403	10.3178	.0160

Results of The Mann-Whitney U Test on Item No. 46

The p values indicate that differences between the students at the origination site and the other three groups varied more than the other paired groups. Students at the origination site generated p values of .0116 when grouped with the professional panel; .0429 with the faculty and .0455 with the students at the remote sites. The lesser significant values were generated when pairing the faculty and professional panel groups with a p value of .2505. The students at the remote sites and the faculty group generated a p value of .3501.

Table 13

Mann-Whitney U Test on Item No. 46

Mean Rank	Cases	Group	
113.49	93	1	student at origination site
130.35	154	2	student at remote site
Total	247	Corrected for ties	

U	W	Z	2-Tailed P
6183.5	10554.5	-1.9995	.0455

Mean Rank	Cases	Group	
54.41	93	1	student at origination site
69.05	20	3	faculty
Total	113	Corrected for ties	

U	W	Z	2-Tailed P
689.0	1381.0	-2.0248	.0429

Mean Rank	Cases	Group	
49.43	93	1	student at origination
72.89	9	4	professional panel
Total	102	Corrected for ties	

U	W	Z	2-Tailed P
226.0	656.0	-2.5228	.0116

Mean Rank	Cases	Group	
86.35	154	2	student at remote site
96.32	20	3	faculty

(table continues)

Mean Rank	Cases		Group		
Total	174			Corrected for ties	
	U		W	Z	2-Tailed P
	1363.5		1926.5	-.9345	.3501
80.53	154	2	student at remote site		
107.11	9	4	professional panel		
Total	163			Corrected for ties	
	U		W	Z	2-Tailed P
	467.0		964.0	-1.8402	.0657
13.98	20	3	faculty		
17.28	9	4	professional panel		
Total	29		Exact	Corrected for ties	
U	W		2-Tailed P	Z	2-Tailed P
69.5	155.5		.3404	-1.1492	.2505

Results of The Kruskal-Wallis H Test on Item No. 47

The lowest mean rank values were from the students at the origination site (123.56), compared to the students at the remote sites, (145.34). This was followed by the faculty with a mean rank of 140.55 and the professional panel with

170.39. These findings suggest varied differences between the paired groups in the responses to Item No. 47.

Table 14

Kruskal-Wallace H Test on Item 47

The instructor should express a positive attitude.

Mean Rank	Cases	Group	
123.65	93	1	student at origination site
145.34	154	2	student at remote site
140.55	20	3	faculty
170.39	9	4	professional panel
	n = 276		

		Corrected for ties	
Chi-Square	Significance	Chi-Square	Significance
5.7987	.1218	7.5673	.0459

Results of The Mann-Whitney U Test on Item No. 47

The only significant difference in this test, indicated by a p value of .0195, was between the student groups. The paired group of the students at the origination sites and the

professional panel came near with a p value of .0524. The next p value was at .2550 between the faculty and the professional panel. The other paired groups had p values of .2996, .3069 and .7499.

Table 15

Mann-Whitney U Test on Item No. 47

Mean Rank	Cases	Group	
111.99	93	1	student at origination site
131.25	154	2	student at remote site
Total	247		Corrected for ties
U	W	Z	2-Tailed P
6044.5	10415.5	-2.3351	.0195
55.72	93	1	student at origination site
62.97	20	3	faculty
Total	113		Corrected for ties
U	W	Z	2-Tailed P
810.5	1259.5	-1.0217	.3069
49.94	93	1	student at origination site
67.61	9	4	professional panel
Total	102		Corrected for ties

(table continues)

Mean Rank	Cases	Group		
	U	W	Z	2-Tailed P
	273.5	608.5	-1.9395	.0524
87.88	154	2	student at remote site	
84.60	20	3	faculty	
Total	174		Corrected for ties	
	U	W	Z	2-Tailed P
	1482.0	1692.0	-.3188	.7499
81.21	154	2	student at remote site	
95.50	9	4	professional panel	
Total	163		Corrected for ties	
	U	W	Z	2-Tailed P
	571.5	859.5	-1.0374	.2996
13.98	20	3	faculty	
17.28	9	4	professional panel	
Total	29	Exact	Corrected for ties	
U	W	2-Tailed P	Z	2-Tailed P
69.5	155.5	.3404	-1.1492	.2505

Results of The Kruskal-Wallis H Test on Item No. 56

The students at the origination site had the highest mean rank of 152.43. The next highest mean rank of 133.86 was from the students at the remote sites, followed by the professional panel at 125.17. The faculty had the lowest mean rank, which was 115.47.

Table 16

Kruskal-Wallace H Test on Item No. 56

The instructor should show awareness of students at the remote sites.

Mean Rank	Cases		Group
152.43	93	1	student at origination site
133.86	154	2	student at remote site
115.47	20	3	faculty
125.17	9	4	professional panel
	n = 276		

		Corrected for ties	
Chi-Square	Significance	Chi-Square	Significance
5.2690	.1531	7.7888	.0496

Results of The Mann-Whitney U Test on Item No. 56

Significant differences were found between the students at the origination site, and both students at the remote sites and the faculty with p values of .0296 and .0150 respectively.

Table 17

Mann-Whitney U Test on Item No. 56

Mean Rank	Cases	Group	
134.32	93	1	student at origination site
117.77	154	2	student at remote site
Total	247		Corrected for ties
	U	W	Z	2-Tailed P
	6201.5	12491.5	-2.1760	.0296
59.70	93	1	student at origination site
44.45	20	3	faculty
Total	113		Corrected for ties
	U	W	Z	2-Tailed P
	679.0	889.0	-2.4117	.0159

(table continues)

Mean Rank	Cases	Group	
52.41	93	1	student at origination site
42.06	9	4	professional panel
Total	102 Total		

	Corrected for ties		
U	W	Z	2-Tailed P
333.5	378.5	-1.3263	.1847

Mean Rank	Cases	Group	
88.81	154	2	student at remote site
77.38	20	3	faculty
Total	174		

	Corrected for ties		
U	W	Z	2-Tailed P
1337.5	1547.5	-1.1231	.2614

Mean Rank	Cases	Group	
82.27	154	2	student at remote site
77.33	9	4	professional panel
Total	163		

	Corrected for ties		
U	W	Z	2-Tailed P
651.0	696.0	-.3613	.7179

Mean Rank	Cases	Group	
14.65	20	3	faculty
15.78	9	4	professional panel

(table continues)

Mean Rank	Cases	Group		
Total	29	Exact	Corrected for ties	
U	W	2-Tailed P	Z	2-Tailed P
83.0	142.0	.7637	-.3755	.7073

Results of The Kruskal-Wallis H Test on Item No. 80

The panel member responses had the highest mean rank of 204.33 in relation to the student's responses with mean ranks of 131.27 and 140.99. The faculty, with a mean rank of 152.95, fell between the students' responses and the professional panel.

Table 18

Kruskal-Wallace H Test on Item 80

Students at all sites should have rosters of the students at all of the other sites for identification purposes and to enhance interaction.

Mean Rank	Cases	Group	
140.99	93	1	student at origination site

(table continues)

Mean Rank	Cases		Group
131.27	154	2	student at remote site
152.95	20	3	faculty
204.33	9	4	professional panel
	n = 276		

		Corrected for ties	
Chi-Square	Significance	Chi-Square	Significance
8.1310	.0434	8.8381	.0308

Results of The Mann-Whitney U Test on Item No. 80

Significant differences were found between the students at the origination site and the professional panel with a p value of .0067, and the students at the remote sites and the professional panel group with a p value of .0079. The other groups lacked significant differences with p values of .1588, .2746, and .4530.

Table 19

Mann-Whitney U Test on Item No. 80

Mean Rank	Cases	Group	
129.77	93	1	student at origination site
120.51	154	2	student at remote site
Total	247		Corrected for ties

U	W	Z	2-Tailed P
6624.0	12069.0	-1.0331	.3016

Mean Rank	Cases	Group	
55.99	93	1	student at origination site
61.67	20	3	faculty
Total	113		Corrected for ties

U	W	Z	2-Tailed P
836.5	1233.5	-.7504	.4530

Mean Rank	Cases	Group	
49.22	93	1	student at origination site
75.06	9	4	professional panel
Total	102		Corrected for ties

U	W	Z	2-Tailed P
206.5	675.5	-2.7092	.0067

(table continues)

Mean Rank	Cases	Group		
86.05	154	2 student at remote site		
98.68	20	3 faculty		
Total	174		Corrected for ties	
	U	W	Z	2-Tailed P
	1316.5	1973.5	-1.0924	.2746

79.71	154	2 student at remote site		
121.17	9	4 professional panel		
Total	163		Corrected for ties	
	U	W	Z	2-Tailed P
	340.5	1090.5	-2.6570	.0079

13.60	20	3 faculty		
18.11	9	4 professional panel		
Total	29	Exact	Corrected for ties	
U	W	2-Tailed P	Z	2-Tailed P
62.0	163.0	1988	-1.4092	.1588

Results of The Kruskal-Wallis H Test on Item No. 85

The value placed on student interaction by the panel and origination site students, with mean ranks of 159.0 and

155.71, were higher than the mean ranks of the students at the remote sites at 130.51. The faculty had a mean rank of 110.80 which suggests a disparity between the responses of the faculty and the other groups. The responses of the students at the remote sites are approximately between the other groups.

Table 20

Kruskal-Wallace H Test on Item 85

All students should have the opportunity to hear and respond to the students at all of the other sites.

Mean Rank	Cases		Group
155.71	93	1	student at origination site
130.51	154	2	student at remote site
110.80	20	3	faculty
159.00	9	4	professional panel
	n = 276		

		Corrected for ties	
Chi-Square	Significance	Chi-Square	Significance
8.8702	.0311	12.5218	.0058

Results of The Mann-Whitney U Test on Item No. 85

Significant differences existed between the responses of the students at the origination site, and responses of both the students at the remote sites and the faculty where p values were found to be .0041 and .0035 respectively. The students at the remote sites, when paired with the faculty and the professional panel, showed p values of .2531 and .2312 respectively. When pairing students at the origination sites and the professional panel the lowest p value of .8855 was generated.

Table 21

Mann-Whitney U Test on Item No. 85

Mean Rank	Cases	Group			
137.99	93	1	student at origination site		
115.55	154	2	student at remote site		
Total	247			Corrected for ties	
	U		W	Z	2-Tailed P
	5859.5		12833.5	-2.8680	.0041

(table continues)

Mean Rank	Cases	Group	
60.31	93	1	student at origination site
41.60	20	3	faculty
Total	113		

Corrected for ties

U	W	Z	2-Tailed P
622.0	832.0	-2.9159	.0035

Mean Rank	Cases	Group	
51.40	93	1	student at origination site
52.50	9	4	professional panel
Total	102		

Corrected for ties

U	W	Z	2-Tailed P
409.5	472.5	-.1439	.8855

Mean Rank	Cases	Group	
88.89	154	2	student at remote site
76.82	20	3	faculty
Total	174		

Corrected for ties

U	W	Z	2-Tailed P
1326.5	1536.5	-1.1429	.2531

Mean Rank	Cases	Group	
81.07	154	2	student at remote site
97.89	9	4	professional panel
Total	163		

Corrected for ties

(table continues)

Mean Rank	Cases	Group		
	U	W	Z	2-Tailed P
	550.0	881.0	-1.1974	.2312
13.38	20	3 faculty		
18.61	9	4 professional panel		
Total	29	Exact	Corrected for ties	
U	W	2-Tailed P	Z	2-Tailed P
57.5	167.5	.1272	-1.7227	.0849

Summary of Significant Differences Between Groups

Table 22 is a simplified breakdown of the significant differences between the four groups in the study for each of the ten items tested. This includes only the *p* levels <.05, to give the reader an indication of where the significant differences occurred, and between which groups.

The groups were established as follows: (a) 1 and 2, students at origination site and students at remote sites; (b) 1 and 3, students at the origination site and faculty; (c) 1 and 4, students at the origination site and professional panel; (d) 2 and 3, faculty and students at

remote sites; (e) 2 and 4, students at remote sites and professional panel; and, (f) 3 and 4, faculty and professional panel

Table 22 is designed to show the distribution of the significant differences identified through the Mann-Whitney Test. As shown, 36% of the significant differences were between group 1 and 2, students at the origination sites and the students at the remote sites. Twenty-three percent of the significant differences were between the 1 and 3 group, the students at the origination sites and the faculty. The 1 and 4 group, the students at the origination sites and the professional panel, had 18% of the significant differences. The 2 and 3 group, the faculty and students at remote sites, had 9% of the significant differences, as did the 2 and 4 group, the students at the remote sites and the professional panel. Five percent of the significant differences occurred between the 3 and 4 group, the faculty and the professional panel.

These data suggest that there may be some degree of difference between the student groups as to what they perceive is important to the success of distance education. The most agreement was between the faculty and the professional panel.

Table 22

Distribution of Significant Differences

Groups	Number of Items	% of Total
1-2	8	36%
1-3	4	23%
1-4	5	18%
2-3	2	9%
2-4	2	9%
3-4	1	5%

To look into the possibility that a trend had developed in the relationships suggested by the previous findings, further investigation was done. The Mann-Whitney U Test was applied to all of the items in the survey, not to find significant differences, as those had already been done, but to look for trends between the responses of the groups. The paired group with the lowest p value was identified in Table 23 with an "X."

Groups 1 and 2, consisting of the students at the origination sites and the students at the remote sites had the greatest number of low p values with 22%. Groups 1 and

3, consisting of the students at the origination sites and the faculty, had 19% of the low p values. Groups 1 and 4, consisting of the students at the origination sites and the professional, had 18% of the lowest p values. Groups 2 and 3, consisting of the students at the remote sites and the faculty, also had 18% of the low p values. Groups 2 and 4, consisting of the students at the remote sites and the professional panel, recorded 13% of the lowest p values, while groups 3 and 4, consisting of the faculty and the professional panel, registered 10% of the lowest p values.

Table 23

Paired Groups With the Lowest P Values

Item No.	1 & 2	1 & 3	1 & 4	2 & 3	2 & 4	3 & 4
1			X			
2	X					
3	X					
4					X	
5	X					
6					X	
7					X	
8			X			
9				X		
10				X		
11			X			
12	X					
13						X

(table continues)

Item No.	1 & 2	1 & 3	1 & 4	2 & 3	2 & 4	3 & 4
14	X					
15					X	
16			X			
17					X	
18		X				
19	X					
20	X					
21					X	
22		X				
23				X		
24		X				
25				X		
26				X		
27	X					
28				X		
29	X					
30	X					
31			X		X	X
32			X			
33						X
34	X					
35			X			
36	X					
37			X			
38			X			
39				X		
40			X			
41		X				
42				X		
43		X				
44						X
45	X					
46			X			
47	X					
48			X			
49						X

(table continues)

Item No.	1 & 2	1 & 3	1 & 4	2 & 3	2 & 4	3 & 4
50		X				
51		X				
52		X				
53	X					
54				X		
55		X				
56				X		
57		X				
58		X				
59						X
60		X				
61				X		
62		X				
63				X		
64					X	
65		X				
66			X			
67			X			
68		X				
69			X			
70		X		X		
71				X		
72				X		
73			X			
74	X					
75					X	
76						X
77				X		
78					X	
79		X				
80			X			
81	X					
82					X	
83			X			
84	X					
85		X				
86						X

(table continues)

Item No.	1 & 2	1 & 3	1 & 4	2 & 3	2 & 4	3 & 4
87	X					
88						X
89	X					
90					X	
91	X					
92					X	
93	X					
94				X		
95			X			
96		X				
97					X	
98						X
99				X		

Research Questions III and IV

The participants were asked to respond to the following question: What factors have you observed that you consider as being desirable to the success of distance education? Approximately 33% of the total population responded to this question. The most desirable factors, in rank order, were convenience, student and faculty interaction, good instructors, and the use of technology. The results is shown in Table 24.

Table 24

Which activities have you observed that you consider as being desirable to the success of distance education?

Generalized Responses	Respondents	Pct.
Convenience, classes closer to home	32	36%
Student/faculty, student/student interaction	27	30%
Instructors organized and teach well	22	25%
Use of technology	8	9%
n =	89	100%

The participants were asked to respond to the following question: What factors have you observed that you consider as being undesirable to the success of distance education? Approximately 33% of the total population responded to this question. The factors they found to be most undesirable, in rank order, were: undisciplined students in the classes; lack of interaction (a contradiction to the findings in the "factors they found most desirable"); technical difficulties,

students not using microphones and delays in receiving papers and grades. The results are shown in Table 25.

Table 25

Which activities have you observed that you consider as being undesirable to the success of distance education?

Generalized Responses	Respondents	Pct.
Convenience, classes closer to home	32	36%
Student/faculty, student/student interaction	27	30%
Instructors organized and teach well	22	25%
Use of technology	8	9%
n =	89	100%

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The purpose of this study was to provide distance education instructors, who teach over a two-way audio and two-way video interactive system, a list of strategies or skills that could be applied in the distance education environment to help ensure success. Further, differences in perceptions among users of the system regarding importance of these strategies were identified.

A list of important strategies were initially identified through the following process: (a) a review of the literature in distance education, (b) discussions with professional educators and administrators involved in distance learning, and (c) personal observations of techniques employed, by professional educators, in the interactive distance education classroom. The review of the literature supplied many of the potential strategies although the additional resources contributed to that list. The strategies were placed in one of five categories: (a) preparing the participant for system use, (b) organizational aspects of the course, (c) teacher or instructor skills, (d) visualizing course content, and (5) human interaction.

A group of professional educators and administrators involved in distance learning were requested to participate in a Delphi study, as a "professional panel," to determine the final list of important items. The Delphi study was responded to by seven of the nine professionals requested to participate in the study. The responses were made on a four point Likert Scale ranging from "1" ("Not important") to "4" ("Highly Important"). Data from the instrument was analyzed and any item with a mean of less than 2.5 was removed from the succeeding round of the Delphi. Of the original 117 items 99 remained at the conclusion of the Delphi study. These were deemed to be the important strategies.

The remaining 99 items were placed in a survey which was validated through a pilot study. The validated version of the survey instrument was responded to by 276 members of the study population. The participants in the study consisted of the 9 panel members, 20 faculty members who were currently teaching courses over the Iowa Communications Network, and 247 of their students, 93 of which were at the origination sites, with the balance being located at remote sites. The surveys were administered to different faculty members and learning groups over a two semester time frame. The surveys were held until all were returned; they were then scanned and the data recorded in preparation for statistical analysis.

Two non-parametric tests were selected to analyze the collected raw data. The Kruskal-Wallis H Test was used to establish whether or not any significant differences existed between responses of the four independent groups. Significant differences (p values of $<.05$) were identified in 10 of the 99 survey items (see Table 3). Items found to have p values of $<.05$ were tested again to pinpoint the differences among the populations.

The second test was selected to establish if the distributions of scores of two independent samples differed significantly from each other. The groups were paired and The Mann-Whitney U test was used to identify significant differences between the groups at the .05 level. The Mann-Whitney U Test did establish that significant differences existed within the selected groups (see Tables 5, 7, 9, 11, 13, 15, 17, 19, and 21).

In addition the researcher ran the Kruskal-Wallace H Test on all 99 items in the survey based on an observation that one group (the students at the origination sites) were, in many cases, one member of the paired groups that were generating the most significant differences.

Data from the two write-in questions, which allowed the respondents to articulate what factors they had observed that they considered desirable and undesirable to the success of

distance education, were collected and analyzed. In response to the write-in question, 33% of the total population filled in that section of the form. There were four activities that were identified as desirable and five undesirable (see Tables 24 & 25).

Conclusions and Discussion

The most important finding to be drawn from this research study, was the identification of the strategies included in the survey instrument. The 99 items that were selected were the backbone of this study. The value of these items to the success of distance education was established through the findings of the Kruskal-Wallace H Test and The Mann-Whitney U Test. The analysis and the conclusions based on The Kruskal-Wallace H Test are described through Tables 2, 4, 6, 8, 10, 12, 14, 16, 18, and 20. The analysis and the conclusions based on The Mann-Whitney U Test are described in Tables 3, 5, 7, 9, 11, 13, 15, 17, 19, and 21.

The analysis of the results of the question related to the importance of a study guide or enhanced syllabus, which supports the semi-independent learning of the students, showed that the the faculty do not feel as strongly that an enhanced syllabus or study guide is as valuable a tool for the students to have as do the students at the remote sites. The professional panel and the students at the origination

site responded most closely and the mean ranks fell between the responses of the other groups. These findings may be indicative of a lack of understanding, by the instructors, regarding the need for expanded course information by both student groups. The professional panel response is also different than the faculty as it is closely related to that of the students at the origination site. The findings suggest the need to question why the enhanced syllabus is perceived as more important to the panel and students at the remote sites than to the students at the origination site or the faculty.

The question related to the study guide in guiding and directing the student's attention to what is expected to be learned generated a dichotomy between the perceived needs by the students and the professional panel, as compared to the faculty. The greatest difference in perceived value lies between the faculty and the students at the remote sites, which suggests that those students may feel the need for added or supplemental information. This may be related to their being off-campus and have less access to on-campus facilities such as the library.

The question concerning the study guide or enhanced syllabus explaining and defining new terms and concepts generated faculty responses that were indicative of their

previous perception of the importance of an enhanced syllabus or study guide. A division is indicated, with a p value of .0061, between the student groups, which had not previously been indicated. These findings may suggest a difference in understanding what an enhanced syllabus is rather than a departure from earlier findings. The affinity between the professional panel and both the students at the origination sites and the remote site students, with closely related p values of .5562 and .6092 respectively, would indicate less disagreement.

The question of site support via site facilitators generated p values that were closely related for all paired groups except for the professional panel. The students and faculty responses were closely related while the professional panel was at the opposite end of the response scale with p values indicated at .0000, .0000 and .0005. This suggests that the panel may not have a good grasp on how important a site facilitator is to the faculty and students. This may be indicative of decisions based on administrative rather than academic factors. The need for a site administrator was also indicated in the responses to the write-in section of the survey. This need was indicated in relation to maintaining order in the remote classrooms.

The question of the instructor being aware of the need for student interaction generated no surprises in responses

to the importance level. The difference in response values showed that the students at the origination site placed the lowest value on interaction. As they are "face-to-face," in the physical presence of the instructor, they would most likely see less of a need for interaction. The higher value placed on this activity by the students at the remote sites and the faculty is not surprising as it suggests a need for more interaction. The higher values by the panel may suggest a greater need for interaction than they see occurring in the classroom.

The responses of the professional panel suggests a faculty need for flexibility as a needed quality of the instructor. This is supported by the faculty, as they indicate this item generated a value similar to the professional panel. The lowest values were those of the students at the origination site, with a slightly higher value indicated by the students at the remote sites. This suggests differences in the need for faculty flexibility in attending to the two student groups. The remote students' response would suggest that the students at the origination site are not aware of the need for the instructor to show flexibility, or they do not, in this instance, have a grasp of what the term "flexibility" means. There were no significant differences found between the faculty, students at the remote sites, and the panel which suggest that they

agree in their responses to the need for the faculty to show flexibility in this environment.

Responses by the professional panel to the suggestion that the instructor express a positive attitude indicates agreement with ther faculty. There were differences in perceptions regarding this question. The lowest values were by the students at the origination site, with a much higher value by the remote site students. The panel, the faculty, and, the students at the remote sites indicated a greater need for the instructor to express a positive attitude. This may be due to a difference in perceptions of what is expected of the instructor.

The interesting factor in regard to the need for faculty awareness of students at remote sites was that the students at the origination site suggested a lower importance value than the students at the remote sites. This may suggest that the students at the origination sites believe that recognition of the remote sites should not take precedence over either of the student locations. The responses of the professional panel may suggest, in support of the faculty, that this is a given and not necessary to be expressed.

Significant differences were found in the responses to the importance of students at all sites having rosters of the students at the other sites for identification and to enhance

interaction. The students at the origination sites and the professional panel had significant differences in their responses. These findings suggest that the panel had placed a higher need on student rosters than either of the student groups. The faculty responses fall in between and on a comparative basis suggest, as do the student groups, that this activity is of less importance to all but the panel.

The importance value placed by the panel and origination site students, for all students having the opportunity to hear and respond to the students at all of the other sites, were higher than the students at the remote sites, and much higher than the faculty. These responses suggest that the students at the remote sites feel that they either have more opportunity to interact, or that they place a higher value on student interaction. The lower value placed on this activity by the faculty is questionable as it suggests that the opportunity for the students to hear and respond to the students at all of the other sites is less important. These findings seem somewhat surprising in that it would seem that this type of interaction would be of major importance to all.

Trends

As indicated in the findings the greatest number of significant differences were found between the two student populations (see Table 22). Also significant was the lack of

differences found between the faculty and the professional panel in their responses to the 10 survey items in this test.

Table 22

Table 22 is a simplified breakdown of the significant differences between the four groups in the study for each of the ten items tested. This includes all p levels, to give an indication of where most of the differences occurred, and between which groups. The distribution indicates that 35% of the significant differences were between the paired group 1 and 2, students at the origination site and students at the remote sites. There were 25% of the significant differences between the paired group 1 and 4, students at the origination site and the professional panel; 20% for the paired group 1 and 3 , students at the origination site and the faculty; and 10% each for the paired group 2 and 3, the faculty and students at the remote sites and the paired group 2 and 4, students at the remote sites and the professional panel. No significant differences occurred between the paired group 3 and 4, the faculty and the professional panel. These data suggest that there may be a high degree of differences between the student groups as to what they perceive is important to the success of distance education. With the most agreement between the faculty and the professional panel.

Table 23

To follow the perception that a trend had developed Table No. 23 was generated. Group 1 and 2, consisting of the students at the origination sites and the students at the remote sites, had the greatest number of low p values with 22%. The next group, 1 and 3, consisting of the students at the origination sites and the faculty had 19% of the lowest p values. Group 1 and 4, consisting of the students at the origination sites and the professional, had 18% of the lowest p values. Group 2 and 3, consisting of the students at the remote sites and the faculty, also shared 18% of the lowest p values. The 2 and 4 group, consisting of the students at the remote sites and the professional panel, recorded 13% of the lowest p values, while the 3 and 4 group, consisting of the faculty and the professional panel, registered 10% of the lowest p values.

Group 1 and 2, consisting of the students at the origination sites and the students at the remote sites, had the greatest number of significant differences (57%). Group 1 and 4, consisting of the students at the origination sites and the professional panel, had the second greatest combined percentages with 43%. The next group, 1 and 3, consisting of the students at the origination sites and the faculty had the third highest combined percentages with 39%. The next group,

2 and 3, consisting of the students at the remote sites and the faculty, had 28% of the combined percentages. The 2 and 4 group, consisting of the students at the remote sites and the professional panel, recorded 23% of the combined percentages, while the 3 and 4 group, consisting of the faculty and the professional panel, registered 10%, which indicates the least difference in perception.

There was considerable agreement between the participants as to which strategies were perceived as important and unimportant to the success of distance education. The faculty and professional panel recorded the least differences in both tests indicating close professional agreement. The largest number of significant differences were found between the students at the origination sites and each of the other groups. This finding suggested a trend, also observed in the findings of the Kruskal-Wallace test, which indicated polarization of the faculty, panel and remote site students as one faction and the origination site students as another.

Recommendations

Several recommendations for further study are as follows:

1. A replication of this study conducted with the following recommendations: (a) same community colleges, different faculty, same professional panel responses from the

first study, with no attempt to deny repeat student participants; (b) different community colleges, different faculty, same professional panel responses from first study; (c) university students, university faculty, and same professional panel responses from first study; and finally (d) responses from an additional professional panel.

This configuration would allow additional community college data while maintaining the professional panel as a constant. This series of studies would also generate data from the university level and another professional panel. The data could be analyzed as was the first study and than restructured in an attempt to find any relationships between the responses of the various paired groups.

2. Conduct a similar study, utilizing the items established in this study, as an observational tool to identify what or if any of these activities are being applied in the distant education environment. In this manner it may be possible to gather information with little bias.

3. Conduct a similar study, using the same data, to look at the responses by categories rather than individual items.

4. Conduct a replication of this study with the recommendation to also identify and collect the following demographic information for comparative analysis:

(a) undergraduate work

(b) graduate work

(c) professional development work

(d) nature of the course:

cognative, motor, or effective

(e) comparison of systems

ICN, IFTS, microwave, compressed video, etc.

(f) degree of training of the instructors

the level or amount of training

training in operation of the equipment only

training in teaching over the system

(g) number of participants

all sites, each site

(h) degree or non-degree program

(i) age of participants

(j) how often course has been taught over the system

(k) instructor

number of courses participated in over the system

number of times taught over the system, and

number of different courses taught over the system

(l) participants

number of courses participated in over the

system, and number of courses

(m) site administrator

yes, no

professional, non-professional

(n) detailed course syllabus

yes, no

Perhaps pursuing these recommendations will allow a more encompassing understanding of what strategies have the most effect on the success of learning at a distance.

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APPENDIX A

THE SURVEY INSTRUMENT

July 1994

Dear Participant:

The attached survey has been designed to identify which items are perceived as being important to the success of distance education. The survey consists of 100 items of which 99 are related to aspects of the study while item number 100 identifies whether you are a student, faculty or professional panel member.

The survey is divided into five categories: 1. Preparing the participant for system use; 2. Organizational aspects of the course; 3. Teacher or Instructor skills; 4. Visualizing course content and; 5. Human Interaction.

This survey will be responded to by professionals in distance learning, instructors who are teaching via distance education and students who are participating in distance education. The data gathered will be utilized to establish through analysis which factors are considered as being important to the success of interactive distance education via two-way audio, two-way video systems.

Information will also be collected to establish which factors that have been observed, by participants in the survey, that are considered as being desirable or undesirable to the success of distance education.

The data gathered through this study will be made available, to those who practice in the field of distance learning, through the Teacher Education Alliance - Iowa Distance Education Alliance - Iowa Star Schools Project and professional journals.

I wish to thank you in advance for your assistance in this study.

Sincerely,

Terry D. Goro
Coordinator, Instructional Technology Services
107 Center for Educational Technology
University of Northern Iowa
Cedar Falls, Iowa 50614

Please read the instructions on the following pages and respond as indicated.

SECTION 1.

1. The following items are related to preparing teachers and students to participate in distance education. Please respond to each item by marking the number on your score sheet that most closely indicates whether you think the item is **Not Important (1) , Highly Important (4) , or somewhere in between.** Please be certain to mark only one number between 1 through 4 on the score sheet for each item and do not mark the number 5 as a choice.

2. At the end of the survey there is space allowed for you to write in which activities that **you have observed** that you consider as being desirable or undesirable to the success of distance education.

Preparing the participant for system use

1. Distance education instructors should have special training to teach over interactive television systems.

   1 2 3 4
   (Not Important) (Highly Important)

2. Distance education instructors should have special training in managing instruction over interactive television systems.

   1 2 3 4
   (Not Important) (Highly Important)

3. Students should be made aware of the unique characteristics of distance learning.

   1 2 3 4
   (Not Important) (Highly Important)

4. Students should be introduced to the unique characteristics of interactive television.

   1 2 3 4
   (Not Important) (Highly Important)

5. An action plan for recovery should be established if the class must be temporarily interrupted or canceled due to technical problems or inclement weather.

   1 2 3 4
   (Not Important) (Highly Important)

SECTION 2.

1. The following items are related to the organization of the course being offered through distance education. Please respond to each item by marking the number on your score sheet that most closely indicates whether you think the item is **Not Important (1) , Highly Important (4) , or somewhere in between.** Please be certain to mark only one number between 1 through 4 on the score sheet for each item and do not mark the number 5 as a choice.

2. At the end of the survey there is space allowed for you to write in which activities that **you have observed** that you consider as being desirable or undesirable to the success of distance education.

Organization

6. Course requirements should be clearly stated.

1 2 3 4

(Not Important) (Highly Important)

7. Course goals and objectives should be clearly communicated.

1 2 3 4

(Not Important) (Highly Important)

8. Performance objectives should be specified and clearly communicated.

1 2 3 4

(Not Important) (Highly Important)

9. Use of a study guide or enhanced syllabus, a master plan for the course, which supports the semi-independent learning of the students should be required.

1 2 3 4

(Not Important) (Highly Important)

10. The study guide or enhanced syllabus for the course should guide and direct the student's attention to what is expected to be learned.

1 2 3 4

(Not Important) (Highly Important)

11. The study guide or enhanced syllabus should be used to minimize the need for note copying and focus attention on the key concepts of the class session.

1 2 3 4

(Not Important) (Highly Important)

12. The study guide or enhanced syllabus should explain and or define new terms and concepts.

1 2 3 4

(Not Important) (Highly Important)

13. The course should be presented in an organized way

1 2 3 4

(Not Important) (Highly Important)

14. The course should be presented in a logical way

1 2 3 4

(Not Important) (Highly Important)

15. The organization of the course, such as the daily class schedule, should be clearly identified.

1 2 3 4

(Not Important) (Highly Important)

16. Learning objectives should be introduced at each class session.

1 2 3 4

(Not Important) (Highly Important)

17. Learning objectives for each class session should be able to be met.

1 2 3 4

(Not Important) (Highly Important)

18. Focus of the class presentation should be on important points of the course objectives.

1 2 3 4

(Not Important) (Highly Important)

19. All instructional activities and various programs should be relevant to the course objectives.

1 2 3 4

(Not Important) (Highly Important)

20. Instructor and student material exchange such as hand outs, test results and papers should be timely.

1 2 3 4

(Not Important) (Highly Important)

21. Material exchange between instructor and student should be handled the same at all sites including the origination site.

1 2 3 4

(Not Important) (Highly Important)

22. Material exchange between instructor and student should occur at each site at the same time.

1 2 3 4

(Not Important) (Highly Important)

23. Material exchange between instructor and student should be easy.

1 2 3 4

(Not Important) (Highly Important)

24. Systematic formative feedback such as quarterly, mid-term and end-of-term examinations should be given.

1 2 3 4

(Not Important) (Highly Important)

25. Systematic corrective feedback and positive reinforcement should be given.

1 2 3 4

(Not Important) (Highly Important)

26. Policies related to such items as student behavior and attendance should be clearly identified.

1 2 3 4

(Not Important) (Highly Important)

27. Overall student behavior at all sites should be maintained at the same level.

1 2 3 4

(Not Important) (Highly Important)

28. Conversation level in the distance classroom should be kept at a level which does not affect the ability of the students to pay attention to the instructor at the origination site.

1 2 3 4

(Not Important) (Highly Important)

29. Ground rules for asking and answering questions should be clarified and set.

1 2 3 4

(Not Important) (Highly Important)

30. The students should have access to the instructor outside of the classroom.

1	2	3	4
(Not Important)			(Highly Important)

31. There should be site support via site facilitators.

1	2	3	4
(Not Important)			(Highly Important)

32. Faculty and student access to the site facilitator should be easy.

1	2	3	4
(Not Important)			(Highly Important)

33. Site facilitator should be knowledgeable, on time, and always present.

1	2	3	4
(Not Important)			(Highly Important)

34. The classroom environment should be conducive to learning and look like a classroom.

1	2	3	4
(Not Important)			(Highly Important)

35. The classroom environment should be designed to accommodate the special needs of distance learning.

1	2	3	4
(Not Important)			(Highly Important)

SECTION 3.

1. The following items are related specifically to activities of the instructors who are teaching via distance education. Please respond to each item by marking the number on your score sheet that most closely indicates whether you think the item is **Not Important (1) , Highly Important (4) , or somewhere in between.** Please be certain to mark only one number between 1 through 4 on the score sheet for each item and do not mark the number 5 as a choice.

2. At the end of the survey there is space allowed for you to write in which activities that **you have observed** that you consider as being desirable or undesirable to the success of distance education.

Instructor

36. The instructor should be aware that the distance learning environment is unique and requires the instructor to think visually.

1	2	3	4
(Not Important)			(Highly Important)

37. The instructor should consider the medium of delivery, television for the distance sites, and its potential to affect the dynamics of instruction.

1	2	3	4
(Not Important)			(Highly Important)

38. The instructor should allow consideration for the delivery of the medium and its potential effect on the design of the course.

1	2	3	4
(Not Important)			(Highly Important)

39. The instructor should be able to utilize the unique attributes of the medium to produce efficiency in instruction.

1	2	3	4
(Not Important)			(Highly Important)

40. The instructor should be aware of the need for student involvement , in the form of interaction, that distance learning requires.

1	2	3	4
(Not Important)			(Highly Important)

41. The instructor should be aware that the distance learner is unique and must understand the needs and motivations of the distance learner.

1	2	3	4
(Not Important)			(Highly Important)

42. Instructor qualities should include vitality and enthusiasm for teaching.

1	2	3	4
(Not Important)			(Highly Important)

43. The instructor should have knowledge of and use the unique communication skills needed in the interactive classroom.

1	2	3	4
(Not Important)			(Highly Important)

44. The instructor should be aware that the distance learning environment is unique and requires the instructor to maximize interaction between student and teacher.

1	2	3	4
(Not Important)			(Highly Important)

45. The instructor should have enthusiasm for teaching the subject that he or she is teaching and that enthusiasm should permeate everything he or she does in the classroom.

1	2	3	4
(Not Important)			(Highly Important)

46. Flexibility should be a needed quality of the instructor.

1	2	3	4
(Not Important)			(Highly Important)

47. The instructor should express a positive attitude.

1	2	3	4
(Not Important)			(Highly Important)

48. Creativity should be a needed quality of the instructor.

1	2	3	4
(Not Important)			(Highly Important)

49. The instructor should be able to work with the interactive television system in such a way that he or she is presented as being in-charge of the technology and not overwhelmed by it.

1 2 3 4

(Not Important) (Highly Important)

50. The instructor should have the ability to work with the technology as a dynamic tool to enhance the instructional process.

1 2 3 4

(Not Important) (Highly Important)

51. The instructor should be aware that the delivery of instruction should include such things as posture and body language.

1 2 3 4

(Not Important) (Highly Important)

52. The instructor should be aware of the overt feedback revealed through facial or physical expression displayed through the medium of television.

1 2 3 4

(Not Important) (Highly Important)

53. The instructor should establish and maintain eye contact with students while talking and listening to them no matter their location.

1 2 3 4

(Not Important) (Highly Important)

54. The interactive system enables the instructor to see and respond to the students at all sites therefore the instructor should maintain a high level of critical feedback.

1 2 3 4

(Not Important) (Highly Important)

55. The instructor should express the same level of rapport with the students at the distant sites as with those at the origination site.

1 2 3 4

(Not Important) (Highly Important)

56. The instructor should show awareness of students at the remote sites.

1 2 3 4

(Not Important) (Highly Important)

57. The instructor should emphasize the need for interaction with participants at the remote sites to ensure their participation.

1 2 3 4
(Not Important) (Highly Important)

58. The instructor should emphasize how easy participation is by emphasizing activities which generate interaction with and between instructor and students at all sites.

1 2 3 4
(Not Important) (Highly Important)

59. The instructor should purposefully act to integrate and synthesize classroom activities at all sites.

1 2 3 4
(Not Important) (Highly Important)

60. The instructor should actively stimulate discussion at all sites.

1 2 3 4
(Not Important) (Highly Important)

61. The instructor should encourage all students to become involved in class activities at all sites.

1 2 3 4
(Not Important) (Highly Important)

62. The instructor should make at least one visit to the remote sites.

1 2 3 4
(Not Important) (Highly Important)

63. On occasion the instructor should generate the class from a remote site instead of the normal origination site.

1 2 3 4
(Not Important) (Highly Important)

64. Access to the instructor should be available at times other than during normal classroom time.

1 2 3 4
(Not Important) (Highly Important)

65. Office hours via telephone access to the instructor should be available.

1 2 3 4
(Not Important) (Highly Important)

SECTION 4.

1. The following items are related to the use of visual media and media in general for presenting course content in the distance learning situation. Please respond to each item by marking the number on your score sheet that most closely indicates whether you think the item is **Not Important (1) , Highly Important (4) , or somewhere in between.** Please be certain to mark only one number between 1 through 4 on the score sheet for each item and do not mark the number 5 as a choice.

2. At the end of the survey there is space allowed for you to write in which activities that **you have observed** that you consider as being desirable or undesirable to the success of distance education.

Visualizing course content

66. The instructor should use visual aids when applicable to enhance and explain course content.

1 2 3 4

(Not Important) (Highly Important)

67. The instructor should use visual illustrations to enhance and explain course content.

1 2 3 4

(Not Important) (Highly Important)

68. Media, methods, and materials should fit the objectives.

1 2 3 4

(Not Important) (Highly Important)

69. The instructor should use the many learning alternatives, media, methods and materials, which best meet the learning requirements of the students.

1 2 3 4

(Not Important) (Highly Important)

70. The instructor should use demonstration when applicable.

1 2 3 4

(Not Important) (Highly Important)

71. Visual aids should be backed up with handouts.

1 2 3 4

(Not Important) (Highly Important)

72. Prepared visual materials should be of high quality.

1 2 3 4

(Not Important) (Highly Important)

73. Prepared visual materials should be specifically applicable to the instruction being given.

1 2 3 4

(Not Important) (Highly Important)

74. Visual materials should be left on screen long enough for the student to absorb and take notes.

1 2 3 4

(Not Important) (Highly Important)

75. Visual materials utilized should be used to enhance instruction and not as lecture notes.

1 2 3 4

(Not Important) (Highly Important)

SECTION 5.

1. The following items are related to instructor/student, student/instructor and student/student interaction in the distant learning classroom. Please respond to each item by marking the number on your score sheet that most closely indicates whether you think the item is **Not Important (1) , Highly Important (4) , or somewhere in between.** Please be certain to mark only one number between 1 through 4 on the score sheet for each item and do not mark the number 5 as a choice.

2. At the end of the survey there is space allowed for you to write in which activities that **you have observed** that you consider as being desirable or undesirable to the success of distance education.

Human Interaction

76. The instructor should acknowledge that there is a difference between students watching instruction and participating in it.

1 2 3 4

(Not Important) (Highly Important)

77. The instructor should explain the difference between watching and participating in instruction and emphasize the value of participation.

1 2 3 4

(Not Important) (Highly Important)

78. The instructor should manipulate the medium to effectively use its unique attributes to induce student interaction.

1 2 3 4
(Not Important) (Highly Important)

79. Students at all the sites should be involved in activities enabling them to get acquainted.

1 2 3 4
(Not Important) (Highly Important)

80. Students at all sites should have rosters of the students at all of the other sites for identification purposes and to enhance interaction.

1 2 3 4
(Not Important) (Highly Important)

81. The students at each site should verbally identify themselves and give their location each time they speak.

1 2 3 4
(Not Important) (Highly Important)

82. The instructor should use site location to identify student name, as in "Cindy in Worthington" .

1 2 3 4
(Not Important) (Highly Important)

83. The instructor should know students names at all sites and use them.

1 2 3 4
(Not Important) (Highly Important)

84. All students should have the opportunity to hear and respond to the instructor.

1 2 3 4
(Not Important) (Highly Important)

85. All students should have the opportunity to hear and respond to the students at all of the other sites.

1 2 3 4
(Not Important) (Highly Important)

86. Any feedback from the instructor should be timely.

1 2 3 4
(Not Important) (Highly Important)

87. Feedback from the instructor should be in the form of positive reinforcement.

1 2 3 4

(Not Important) (Highly Important)

88. There should be a considerable amount of interaction between student and instructor.

1 2 3 4

(Not Important) (Highly Important)

89. Students should have the opportunity to interact with the instructor during class instruction.

1 2 3 4

(Not Important) (Highly Important)

90. There should be an opportunity for interaction between students at all sites during class instruction.

1 2 3 4

(Not Important) (Highly Important)

91. Interaction and participation from a remote location should be easy.

1 2 3 4

(Not Important) (Highly Important)

92. There should be an emphasis on learner activities, exercises, and projects involving student-student interaction.

1 2 3 4

(Not Important) (Highly Important)

93. Optional study sessions with the instructor or an aide via television should be available at all sites via the interactive system.

1 2 3 4

(Not Important) (Highly Important)

94. Interaction at a distant site should be no more difficult than at the origination site.

1 2 3 4

(Not Important) (Highly Important)

95. Instruction should be performance and involvement oriented.

1 2 3 4

(Not Important) (Highly Important)

96. Instruction should be designed to maximize student interaction through class discussion.

1	2	3	4
(Not Important)			(Highly Important)

97. Group dynamics should be maximized through formalized discussion sessions among students across sites.

1	2	3	4
(Not Important)			(Highly Important)

98. To maximize interaction among all sites a process for shared student responses should be implemented.

1	2	3	4
(Not Important)			(Highly Important)

99. Student peer support should be created and fostered.

1	2	3	4
(Not Important)			(Highly Important)

100. Please mark the number on your score sheet which describes you.

1	2	3	4
(Student at the Origination Site)	(Student at a Remote Site)	(Faculty)	(Professional Panel)

Which activities **have you observed** that you consider as being **desirable** to the success of distance education?

Which activities **have you observed** that you consider as being **undesirable** to the success of distance education?

APPENDIX B

SELECTION OF THE IMPORTANT FACTORS: FIRST ROUND

INCLUDING DATA COLLECTED FROM DELPHI ROUND ONE

Monday, November 1, 1993

Dr. Xxxxx Xxxxxx
Professor
University of Xxxxxxxx
Xxxxx, IA. XXXXXX

Dear Xxxxx:

Please find enclosed the survey we discussed over the telephone, for which you are an expert panel member. You will also find enclosed a prepaid mailer to return the survey. I would appreciate a one week turnaround if possible. The quick turnaround will allow me to send the second round of the survey within 10 working days of receiving all completed copies of this first round.

The attached survey is step one of a two - step modified Delphi technique to establish those items to be used in the survey instrument. This initial instrument is designed to identify which factors are perceived as being Not Important to the success of distance education by a professional panel with distance education experience. The instrument consists of 117 items divided into five categories: 1. Preparing the participant for system use; 2. Organizational aspects of the course; 3. Teacher or Instructor skills; 4. Visualizing course content and; 5. Human Interaction.

The finished instrument will be used to: 1) establish the extent of agreement regarding those factors between a professional panel, instructors who have taught or are teaching via distance education and, students who have participated in distance education at a distant site and ; 2) establish which factors that have been observed, by a panel of professionals in distance education, instructors who have taught or are teaching via distance education, and students who have participated in distance education at a distant site, that are considered as being desirable or undesirable to the success of distance education.

I appreciate your interest in this survey and wish to thank you in advance for your consideration and assistance in turning this information around in a short time.

Sincerely,

Terry D. Goro
Coordinator, Instructional Technology Services
Center for Educational Technology
University of Northern Iowa
Cedar Falls, Iowa 50614

Please read the instructions on the following pages and respond as indicated.

SECTION 1.

1. The following items are related to preparing teachers and students to participate in distance education. Please respond to each item by circling the number that most closely indicates whether you think the item is **Not Important (1) , Highly Important (4) , or somewhere in between.** Please be certain to circle one of the printed numbers and do not indicate the space between the numbers as a choice.

2. At the end of this section there is space allocated for you to make comments and/or add items which have not been addressed but you perceive to be important and should be included in this section.

Preparing the participant for system use

1. Distance education instructors should have special training to teach over interactive television systems.

   1 2 3 4

   (Not Important) (Highly Important)

2. Distance education instructors should have special training in managing instruction over interactive television systems.

   1 2 3 4

   (Not Important) (Highly Important)

3. First-time student participants of distance learning should have a mandatory orientation session to assist them in becoming comfortable with this method of instruction.

   1 2 3 4

   (Not Important) (Highly Important)

4. Students should be made aware of the unique characteristics of distance learning.

   1 2 3 4

   (Not Important) (Highly Important)

5. Students should be introduced to the unique characteristics of interactive television.

   1 2 3 4

   (Not Important) (Highly Important)

6. First-time student participants should be made aware of the degree of student and instructor participation that distance learning requires.

   1 2 3 4

   (Not Important) (Highly Important)

7. Students should have an opportunity to get comfortable interacting with the hardware of distance education before the actual class begins

1 2 3 4

(Not Important) (Highly Important)

8. All students, including those at the origination site, should be made aware of the need to identify themselves when interacting over the system.

1 2 3 4

(Not Important) (Highly Important)

9. An action plan for recovery should be established if the class must be temporarily interrupted or cancelled due to technical problems or inclement weather.

1 2 3 4

(Not Important) (Highly Important)

SECTION 2.

1. The following items are related to the organization of the course being offered through distance education. Please respond to each item by circling the number that most closely indicates whether you think the item is **Not Important (1) , Highly Important (4) , or somewhere in between.** Please be certain to circle one of the printed numbers and do not indicate the space between the numbers as a choice.

2. At the end of this section there is space allocated for you to make comments and/or add items which have not been addressed but you perceive to be important and should be included in this section.

Organization

10. Course requirements should be clearly stated.

1 2 3 4

(Not Important) (Highly Important)

11. Course goals and objectives should be clearly communicated.

1 2 3 4

(Not Important) (Highly Important)

12. Performance objectives should be specified and clearly communicated.

1 2 3 4

(Not Important) (Highly Important)

13. Use of a study guide or enhanced syllabus, a master plan for the course, which supports the semi-independent learning of the students should be required.

1 2 3 4

(Not Important) (Highly Important)

14. The study guide or enhanced syllabus for the course should guide and direct the student's attention to what is expected to be learned.

1 2 3 4

(Not Important) (Highly Important)

15. The study guide or enhanced syllabus should be used to minimize the need for note copying and focus attention on the key concepts of the class session.

1 2 3 4

(Not Important) (Highly Important)

16. The study guide or enhanced syllabus should explain and or define new terms and concepts.

1	2	3	4
(Not Important)			(Highly Important)

17. The course should be presented in an organized way

1	2	3	4
(Not Important)			(Highly Important)

18. The course should be presented in a logical way

1	2	3	4
(Not Important)			(Highly Important)

19. The organization of the course, such as the daily class schedule, should be clearly identified.

1	2	3	4
(Not Important)			(Highly Important)

20. Learning objectives should be introduced at each class session.

1	2	3	4
(Not Important)			(Highly Important)

21. Learning objectives for each class session should be able to be met.

1	2	3	4
(Not Important)			(Highly Important)

22. Each class session should begin with a review of the previous class session.

1	2	3	4
(Not Important)			(Highly Important)

23. Focus of the class presentation should be on important points of the course objectives.

1	2	3	4
(Not Important)			(Highly Important)

24. All instructional activities and various programs should be relevant to the course objectives.

1	2	3	4
(Not Important)			(Highly Important)

25. Each class session should conclude with a summary of the days lessons.

1	2	3	4
(Not Important)			(Highly Important)

26. Instructor and student material exchange such as hand outs, test results and papers should be timely.

1 2 3 4

(Not Important) (Highly Important)

27. Material exchange between instructor and student should be handled the same at all sites including the origination site.

1 2 3 4

(Not Important) (Highly Important)

28. Material exchange between instructor and student should occur at each site at the same time.

1 2 3 4

(Not Important) (Highly Important)

29. Material exchange between instructor and student should be easy.

1 2 3 4

(Not Important) (Highly Important)

30. Systematic formative feedback such as quarterly, mid-term and end-of-term examinations should be given.

1 2 3 4

(Not Important) (Highly Important)

31. Systematic corrective feedback and positive reinforcement should be given.

1 2 3 4

(Not Important) (Highly Important)

32. Policies related to such items as student behavior and attendance should be clearly identified.

1 2 3 4

(Not Important) (Highly Important)

33. Overall student behavior at all sites should be maintained at the same level.

1 2 3 4

(Not Important) (Highly Important)

34. Conversation level in the distance classroom should be kept at a level which does not affect the ability of the students to pay attention to the instructor at the origination site.

1 2 3 4

(Not Important) (Highly Important)

35. Ground rules for asking and answering questions should be clarified and set.

1 2 3 4

(Not Important) (Highly Important)

36. The students should have access to the instructor outside of the classroom.

1 2 3 4

(Not Important) (Highly Important)

37. There should be site support via site facilitators.

1 2 3 4

(Not Important) (Highly Important)

38. Site facilitators should be in each distance classroom throughout the entire class period.

1 2 3 4

(Not Important) (Highly Important)

39. Faculty and student access to the site facilitator should be easy.

1 2 3 4

(Not Important) (Highly Important)

40. Site facilitator should be knowledgeable, on time, and always present.

1 2 3 4

(Not Important) (Highly Important)

41. The classroom environment should be conducive to learning and look like a classroom.

1 2 3 4

(Not Important) (Highly Important)

42. The classroom environment should be designed to accommodate the special needs of distance learning.

1 2 3 4

(Not Important) (Highly Important)

SECTION 3.

1. The following items are related specifically to activities of the instructors who are teaching via distance education. Please respond to each item by circling the number that most closely indicates whether you think the item is **Not Important (1) , Highly Important (4) , or somewhere in between.** Please be certain to circle one of the printed numbers and do not indicate the space between the numbers as a choice.

2. At the end of this section there is space allocated for you to make comments and/or add items which have not been addressed but you perceive to be important and should be included in this section.

Instructor

43. The instructor should be aware that the distance learning environment is unique and requires the instructor to think visually.

1	2	3	4
(Not Important)			(Highly Important)

44. The instructor should consider the medium of delivery, television for the distance sites, and its potential to affect the dynamics of instruction.

1	2	3	4
(Not Important)			(Highly Important)

45. The instructor should allow consideration for the delivery of the medium and its potential effect on the design of the course.

1	2	3	4
(Not Important)			(Highly Important)

46. The instructor should be able to utilize the unique attributes of the medium to produce efficiency in instruction.

1	2	3	4
(Not Important)			(Highly Important)

47. The instructor should be aware of the need for student involvement , in the form of interaction, that distance learning requires.

1	2	3	4
(Not Important)			(Highly Important)

48. The instructor should be aware that the distance learner is unique and must understand the needs and motivations of the distance learner.

1 2 3 4
(Not Important) (Highly Important)

49. Personal qualities of the instructor should include such as personality and poise.

1 2 3 4
(Not Important) (Highly Important)

50. Instructor qualities should include vitality and enthusiasm for teaching.

1 2 3 4
(Not Important) (Highly Important)

51. The instructor should have knowledge of and use the unique communication skills needed in the interactive classroom.

1 2 3 4
(Not Important) (Highly Important)

52. The instructor should be aware that the distance learning environment is unique and requires the instructor to maximize interaction between student and teacher.

1 2 3 4
(Not Important) (Highly Important)

53. The instructor should have enthusiasm for teaching the subject that he or she is teaching and that enthusiasm should permeate everything he or she does in the classroom.

1 2 3 4
(Not Important) (Highly Important)

54. Flexibility should be a needed quality of the instructor.

1 2 3 4
(Not Important) (Highly Important)

55. The instructor should express a positive attitude.

1 2 3 4
(Not Important) (Highly Important)

56. Creativity should be a needed quality of the instructor.

1 2 3 4

(Not Important) (Highly Important)

57. A high self-esteem should be expressed by the instructor.

1 2 3 4

(Not Important) (Highly Important)

58. The instructor should be able to work with the interactive television system in such a way that he or she is presented as being in-charge of the technology and not overwhelmed by it.

1 2 3 4

(Not Important) (Highly Important)

59. The instructor should have the ability to work with the technology as a dynamic tool to enhance the instructional process.

1 2 3 4

(Not Important) (Highly Important)

60. The instructor should be aware that the delivery of instruction should include such things as posture and body language.

1 2 3 4

(Not Important) (Highly Important)

61. The instructor should be aware of the overt feedback revealed through facial or physical expression displayed through the medium of television.

1 2 3 4

(Not Important) (Highly Important)

62. The instructor should establish and maintain eye contact with students while talking and listening to them no matter their location.

1 2 3 4

(Not Important) (Highly Important)

63. The interactive system enables the instructor to see and respond to the students at all sites therefore the instructor should maintain a high level of critical feedback.

1 2 3 4

(Not Important) (Highly Important)

64. The instructor should express the same level of rapport with the students at the distant sites as with those at the origination site.

1 2 3 4
(Not Important) (Highly Important)

65. The instructor should show awareness of students at the remote sites.

1 2 3 4
(Not Important) (Highly Important)

66. The instructor should emphasize the need for interaction with participants at the remote sites to ensure their participation.

1 2 3 4
(Not Important) (Highly Important)

67. The instructor should emphasize how easy participation is by emphasizing activities which generate interaction with and between instructor and students at all sites.

1 2 3 4
(Not Important) (Highly Important)

68. The instructor should purposefully act to integrate and synthesize classroom activities at all sites.

1 2 3 4
(Not Important) (Highly Important)

69. The instructor should actively stimulate discussion at all sites.

1 2 3 4
(Not Important) (Highly Important)

70. The instructor should encourage all students to become involved in class activities at all sites.

1 2 3 4
(Not Important) (Highly Important)

71. The instructor should make at least one visit to the remote sites.

1 2 3 4
(Not Important) (Highly Important)

72. On occasion the instructor should generate the class from a remote site instead of the normal origination site.

1 2 3 4
(Not Important) (Highly Important)

73. Access to the instructor should be available at times other than during normal classroom time.

1 2 3 4

(Not Important) (Highly Important)

74. Face to face access to the instructor should be available outside of normal classroom hours.

1 2 3 4

(Not Important) (Highly Important)

75. Office hours via telephone access to the instructor should be available.

1 2 3 4

(Not Important) (Highly Important)

SECTION 4.

1. The following items are related to the use of visual media and media in general for presenting course content in the distance learning situation. Please respond to each item by circling the number that most closely indicates whether you think the item is **Not Important (1) , Highly Important (4) , or somewhere in between.** Please be certain to circle one of the printed numbers and do not indicate the space between the numbers as a choice.

2. At the end of this section there is space allocated for you to make comments and/or add items which have not been addressed but you perceive to be important and should be included in this section.

Visualizing course content

76. The instructor should use visual aids when applicable to enhance and explain course content.

1 2 3 4

(Not Important) (Highly Important)

77. The instructor should use visual illustrations to enhance and explain course content.

1 2 3 4

(Not Important) (Highly Important)

78. Media, methods, and materials should fit the objectives.

1 2 3 4

(Not Important) (Highly Important)

79. The instructor should use the many learning alternatives, media, methods and materials, which best meet the learning requirements of the students.

1 2 3 4

(Not Important) (Highly Important)

80. The instructor should use demonstration when applicable.

1 2 3 4

(Not Important) (Highly Important)

81. Visual aids should be backed up with handouts.

1 2 3 4

(Not Important) (Highly Important)

82. Prepared visual materials should be of high quality.

1 2 3 4

(Not Important) (Highly Important)

83. Prepared visual materials.should be specifically applicable to the instruction being given.

1 2 3 4

(Not Important) (Highly Important)

84. Visual materials should be left on screen long enough for the student to absorb and take notes.

1 2 3 4

(Not Important) (Highly Important)

85. Visual materials utilized should be used to enhance instruction and not as lecture notes.

1 2 3 4

(Not Important) (Highly Important)

SECTION 5.

1. The following items are related to instructor/student, student/instructor and student/student interaction in the distant learning classroom. Please respond to each item by circling the number that most closely indicates whether you think the item is **Not Important (1) , Highly Important (4) , or somewhere in between.** Please be certain to circle one of the printed numbers and do not indicate the space between the numbers as a choice.

2. At the end of this section there is space allocated for you to make comments and/or add items which have not been addressed but you perceive to be important and should be included in this section.

Human Interaction

86. The instructor should acknowledge that there is a difference between students watching instruction and participating in it.

1 2 3 4

(Not Important) (Highly Important)

87. The instructor should explain the difference between watching and participating in instruction and emphasize the value of participation.

1 2 3 4

(Not Important) (Highly Important)

88. The student should acknowledge the difference between watching instruction and participating in it and practices participating in the instruction.

1 2 3 4

(Not Important) (Highly Important)

89. The instructor should manipulate the medium to effectively use its unique attributes to induce student interaction.

1 2 3 4
(Not Important) (Highly Important)

90. Students at all the sites should be involved in activities enabling them to get acquainted.

1 2 3 4
(Not Important) (Highly Important)

91. Students at all sites should have rosters of the students at all of the other sites for identification purposes and to enhance interaction.

1 2 3 4
(Not Important) (Highly Important)

92. The students at each site should verbally sign on by introducing themselves at the beginning of each class session.

1 2 3 4
(Not Important) (Highly Important)

93. The students at each site should verbally identify themselves and give their location each time they speak.

1 2 3 4
(Not Important) (Highly Important)

94. The instructor should use site location to identify student name, as in "Cindy in Worthington" .

1 2 3 4
(Not Important) (Highly Important)

95. The instructor should know students names at all sites and use them.

1 2 3 4
(Not Important) (Highly Important)

96. All students should have the opportunity to hear and respond to the instructor.

1 2 3 4
(Not Important) (Highly Important)

97. All students should have the opportunity to hear and respond to the students at all of the other sites.

1 2 3 4
(Not Important) (Highly Important)

98. Any feedback from the instructor should be timely.

1	2	3	4
(Not Important)			(Highly Important)

99. Feedback from the instructor should be in the form of positive reinforcement.

1	2	3	4
(Not Important)			(Highly Important)

100. There should be a considerable amount of interaction between student and instructor.

1	2	3	4
(Not Important)			(Highly Important)

101. Students should have the opportunity to interact with the instructor during class instruction.

1	2	3	4
(Not Important)			(Highly Important)

102. There should be an opportunity for interaction between students at all sites during class instruction..

1	2	3	4
(Not Important)			(Highly Important)

103. Interaction and participation from a remote location should be easy

1	2	3	4
(Not Important)			(Highly Important)

104. There should be an emphasis on learner activities, exercises, and projects involving student-student interaction.

1	2	3	4
(Not Important)			(Highly Important)

105. There should be optional study sessions available at all sites.

1	2	3	4
(Not Important)			(Highly Important)

106. Optional study sessions with the instructor or an aide via television should be available at all sites via the interactive system.

1	2	3	4
(Not Important)			(Highly Important)

107. There should be off-class time opportunity for students to interact with students at other sites.

1 2 3 4

(Not Important) (Highly Important)

108. Students should have an opportunity to get to know the students at the other sites.

1 2 3 4

(Not Important) (Highly Important)

109. Interaction at a distant site should be no more difficult than at the origination site.

1 2 3 4

(Not Important) (Highly Important)

110. There should be some type of activity which brings together class members from all sites.

1 2 3 4

(Not Important) (Highly Important)

111. There should be planned social activities for students at all sites.

1 2 3 4

(Not Important) (Highly Important)

112. Instruction should be performance and involvement oriented.

1 2 3 4

(Not Important) (Highly Important)

113. Instruction should be designed to maximize student interaction through class discussion.

1 2 3 4

(Not Important) (Highly Important)

114. Group dynamics should be maximized through formalized discussion sessions among students across sites.

1 2 3 4

(Not Important) (Highly Important)

115. To maximize interaction among all sites a process for shared student responses should be implemented.

1 2 3 4

(Not Important) (Highly Important)

116. Student peer support should be created and fostered.

1	2	3	4
(Not Important)			(Highly Important)

117. Student interaction should be maximized through peer teaching.

1	2	3	4
(Not Important)			(Highly Important)

THANK YOU FOR YOUR COOPERATION IN COMPLETING THIS SURVEY

The responses of the Professional Panel were processed and the data analyzed. Those survey items with a mean value of less than 2.5 were dropped, the outcome indicated the following items be dropped:

Survey item 6. First-time student participants should be made aware of the degree of student and instructor participation that distance learning requires.

The mean value was 2.14.

Survey item 22. Each class session should begin with a review of the previous class session.

The mean value was 2.43.

Survey item 25. Each class session should conclude with a summary of the day's lessons.

The mean value was 2.43.

Survey item 38. Site facilitators should be in each distance classroom throughout the entire class period.

The mean value was 1.86.

Survey item 49. Personal qualities of the instructor should include such as personality and poise.

The mean value was 2.29.

Survey item 57. A high self-esteem should be expressed by the instructor.

The mean value was 2.00.

Survey item 92. The students at each site should verbally sign on by introducing themselves at the beginning of each class session.

The mean value was 2.0.

Survey item 105. There should be optional study sessions available at all sites.

The mean value was 2.43.

Survey item 107. There should be off-class time opportunity for students to interact with students at other sites.

The mean value was 2.14.

Survey item 108. Students should have an opportunity to get to know the students at the other sites.

The mean value was 2.13.

Table 26, Delphi Study First Round, indicates the response frequency, and the mean established for each item in the initial survey based on the first round of the Delphi study. The items to be dropped at <.05 are indicated by a double asterisk preceding the item number.

Table 26

Delphi Study First Round

	Response Frequency					
Item	1	2	3	4	n	Mean
1	0	0	3	4	7	3.57
2	0	0	4	3	7	3.43
3	1	0	4	2	7	3.00
4	1	0	6	0	7	2.71
5	0	2	4	1	7	2.86
**6	2	3	1	1	7	2.14
7	0	3	1	3	7	3.00
8	0	4	2	1	7	2.57
9	0	0	1	6	7	3.86
10	0	0	1	6	7	3.86
11	0	0	1	6	7	3.86
12	0	1	1	5	7	3.57
13	0	0	4	3	7	3.43
14	0	0	3	4	7	3.57
15	1	0	4	2	7	3.00
16	0	1	5	1	7	3.00
17	0	0	1	6	7	3.86
18	0	0	2	5	7	3.71
19	0	0	5	2	7	3.29
20	0	2	4	1	7	2.86
21	1	1	4	1	7	2.71
**22	1	2	4	0	7	2.43
23	0	1	5	1	7	3.00
24	0	2	1	4	7	3.29
**25	1	2	4	0	7	2.43
26	0	0	2	5	7	3.71
27	0	1	1	5	7	3.57
28	1	2	1	3	7	2.86
29	0	0	2	5	7	3.71
30	0	0	4	3	7	3.43
31	0	0	3	4	7	3.57
32	0	0	3	4	7	3.57

(table continues)

	Response Frequency					
Item	1	2	3	4	n	Mean
33	0	0	4	3	7	3.43
34	0	0	4	3	7	3.43
35	0	0	6	1	7	3.14
36	0	0	1	6	7	3.86
37	0	1	2	4	7	3.43
**38	4	1	1	1	7	1.86
39	0	1	2	4	7	3.43
40	0	2	2	3	7	3.14
41	0	1	3	3	7	3.29
42	0	1	3	3	7	3.29
43	0	1	1	5	7	3.57
44	0	1	1	5	7	3.57
45	0	1	2	4	7	3.43
46	0	1	2	4	7	3.43
47	0	1	2	4	7	3.43
48	1	2	0	4	7	3.00
**49	1	3	3	0	7	2.29
50	0	1	1	5	7	3.57
51	0	2	0	5	7	3.43
52	0	2	1	4	7	3.29
53	0	1	1	5	7	3.57
54	0	0	2	5	7	3.71
55	0	0	2	5	7	3.71
56	0	0	5	2	7	3.29
**57	2	4	0	1	7	2.00
58	0	1	2	4	7	3.43
59	1	0	3	3	7	3.14
60	1	1	4	1	7	2.71
61	0	3	3	1	7	2.71
62	0	1	3	3	7	3.29
63	1	0	5	1	7	2.86
64	0	0	0	7	7	4.00
65	0	0	0	7	7	4.00
66	0	0	1	6	7	3.86

(table continues)

	Response Frequency					
Item	1	2	3	4	n	Mean
67	0	0	4	3	7	3.43
68	0	1	4	2	7	3.14
69	0	0	3	4	7	3.57
70	0	0	0	7	7	4.00
71	0	1	2	4	7	3.43
72	0	1	2	4	7	3.43
73	0	0	4	3	7	3.43
74	0	4	1	2	7	2.71
75	1	0	1	5	7	3.43
76	0	0	2	5	7	3.71
77	0	0	3	4	7	3.57
78	0	0	1	6	7	3.86
79	0	0	3	4	7	3.57
80	0	0	4	3	7	3.43
81	0	1	5	1	7	3.00
82	0	0	6	1	7	3.14
83	0	0	3	4	7	3.57
84	0	0	4	3	7	3.43
85	0	0	4	3	7	3.43
86	0	0	2	5	7	3.71
87	0	1	3	3	7	3.29
88	0	1	4	2	7	3.14
89	0	0	3	4	7	3.57
90	0	0	3	4	7	3.57
91	0	3	3	1	7	2.71
**92	3	1	3	0	7	2.00
93	1	2	2	2	7	2.71
94	1	0	4	2	7	3.00
95	0	0	3	4	7	3.57
96	0	0	1	6	7	3.86
97	0	0	1	6	7	3.86
98	0	0	2	5	7	3.71
99	0	2	3	2	7	3.00
100	0	1	4	2	7	3.14

(table continues)

	Response Frequency					
Item	1	2	3	4	n	Mean
101	0	0	2	5	7	3.71
102	0	1	4	2	7	3.14
103	0	0	1	6	7	3.86
104	0	1	5	1	7	3.00
**105	0	4	3	0	7	2.43
106	0	3	4	0	7	2.57
**107	1	4	2	0	7	2.14
**108	2	3	3	0	8	2.13
109	0	0	1	6	7	3.86
110	0	1	5	1	7	3.00
111	0	4	2	1	7	2.57
112	0	0	5	2	7	3.29
113	0	1	3	3	7	3.29
114	0	0	5	2	7	3.29
115	0	2	5	0	7	2.71
116	0	0	4	3	7	3.43
117	0	2	4	1	7	2.86

APPENDIX C

SELECTION OF THE IMPORTANT FACTORS: SECOND ROUND INCLUDING DATA COLLECTED FROM DELPHI ROUND TWO

Delphi Round Two

In the second round of the Delphi the survey contained a list of 107 items. As in the first round Delphi, the professional panel was asked to respond to the survey items by rating them on a 4 point Likert scale with 1 being "not important" and 4 being "highly important" to the success of distance learning. Survey items with a mean value of less than 2.5 were dropped from the survey. The outcome indicated the following items be dropped:

Survey item 3. First-time student participants of distance learning should have a mandatory orientation session to assist them in becoming comfortable with this method of instruction.

The mean value was 2.33.

Survey item 6. Students should have an opportunity to get comfortable interacting with the hardware of distance education before the actual class begins.

The mean value was 2.33.

Survey item 7. All students, including those at the origination site, should be made aware of the need to identify themselves when interacting over the system.

The mean value was 2.17.

Survey item 68. Face to face access to the instructor should be available outside of normal classroom hours.

The mean value was 2.17.

Survey item 82. The student should acknowledge the difference between watching instruction and participating in it and practices participating in the instruction.

The mean value was 2.33.

Survey item 100. There should be some type of activity which brings together class members from all sites.

The mean value was 2.0.

Survey item 101. There should be planned social activities for students at all sites.

The mean value was 1.50.

Survey item 107. Student interaction should be maximized through peer teaching.

The mean value was 2.33.

Table 27, Delphi Study Second Round indicates the response frequency, and the mean established for each item in the survey based on the second round of the Delphi study. The items to be dropped at <.05 are indicated by a double asterisk preceding the item number.

Table 27

Delphi Study Second Round

	Response Frequency					
Item	1	2	3	4	n	Mean
	not important			highly important		
1	0	1	1	4	6	3.50
2	0	2	1	3	6	3.17
**3	1	2	2	1	6	2.50
4	0	2	2	2	6	3.00
5	0	2	2	2	6	3.00
**6	0	5	0	1	6	2.33
**7	1	4	0	1	6	2.17
8	0	1	2	3	6	3.33
9	0	1	1	4	6	3.50
10	0	0	2	4	6	3.67
11	0	0	3	3	6	3.50
12	0	0	5	1	6	3.17
13	0	0	3	3	6	3.50
14	0	2	2	2	6	3.00
15	0	2	1	3	6	3.17
16	0	0	0	6	6	4.00
17	0	0	1	5	6	3.83
18	0	0	3	3	6	3.50
19	0	1	4	1	6	3.00
20	0	2	3	1	6	2.83
21	0	2	2	2	6	3.00
22	0	0	5	1	6	3.17
23	0	0	2	4	6	3.67
24	0	1	1	4	6	3.50
25	1	2	0	3	6	2.83
26	0	1	2	3	6	3.33
27	0	1	3	2	6	3.17
28	0	1	2	3	6	3.33
29	0	1	2	3	6	3.33
30	0	2	2	2	6	3.00

(table continues)

Item	Response Frequency 1	2	3	4	n	Mean
	not important			highly important		
31	0	0	2	4	6	3.67
32	0	1	3	2	6	3.17
33	0	0	3	3	6	3.50
34	1	0	2	3	6	3.17
35	1	0	2	3	6	3.17
36	1	1	2	2	6	2.83
37	0	0	5	1	6	3.17
38	0	1	3	2	6	3.17
39	0	0	3	3	6	3.50
40	0	1	2	3	6	3.33
41	0	1	2	3	6	3.33
42	0	1	4	1	6	3.00
43	0	1	1	4	6	3.50
44	1	0	3	2	6	3.00
45	0	1	3	2	6	3.17
46	1	1	0	4	6	3.17
47	1	1	0	4	6	3.17
48	0	0	2	4	6	3.67
49	0	0	2	4	6	3.67
50	0	0	3	3	6	3.50
51	1	0	2	3	6	3.17
52	0	0	4	2	6	3.33
53	0	1	3	2	6	3.17
54	1	1	3	1	6	2.67
55	1	0	4	1	6	2.83
56	1	1	2	2	6	2.83
57	1	0	3	2	6	3.00
58	0	1	1	4	6	3.50
59	0	0	1	5	6	3.83
60	0	1	0	5	6	3.67
61	0	1	2	3	6	3.33

(table continues)

Item	Response Frequency 1 not important	2	3	4 highly important	n	Mean
62	0	1	1	4	6	3.50
63	0	0	1	5	6	3.83
64	0	1	2	3	6	3.33
65	1	1	2	2	6	2.83
66	1	1	2	2	6	2.83
67	0	0	2	4	6	3.67
**68	1	3	2	0	6	2.17
69	0	0	3	3	6	3.50
70	0	1	1	4	6	3.50
71	0	1	2	3	6	3.33
72	0	0	2	4	6	3.67
73	0	1	2	3	6	3.33
74	0	2	2	2	6	3.00
75	0	2	3	1	6	2.83
76	0	2	2	2	6	3.00
77	0	0	4	2	6	3.33
78	0	1	2	3	6	3.33
79	0	1	3	2	6	3.17
**80	1	0	1	4	6	3.33
81	0	1	4	1	6	3.00
82	1	3	1	1	6	2.33
83	1	0	3	2	6	3.00
84	0	0	5	1	6	3.17
85	0	2	4	0	6	2.67
86	0	2	4	0	6	2.67
87	1	0	5	0	6	2.67
88	0	0	3	3	6	3.50
89	0	0	3	3	6	3.50
90	0	0	3	3	6	3.50
91	0	1	1	4	6	3.50
92	1	2	1	2	6	2.67
93	0	1	2	3	6	3.33

(table continues)

Item	Response Frequency 1	2	3	4	n	Mean
	not important			highly important		
94	0	0	4	2	6	3.33
95	0	1	4	1	6	3.00
96	0	1	1	4	6	3.50
97	1	0	3	2	6	3.00
98	0	4	1	1	6	2.50
99	0	1	2	3	6	3.33
**100	2	2	2	0	6	2.00
**101	4	1	1	0	6	1.50
102	0	2	3	1	6	2.83
103	0	0	3	3	6	3.50
104	0	1	3	2	6	3.17
105	0	2	4	0	6	2.67
106	1	1	2	2	6	2.83
**107	1	2	3	0	6	2.33

APPENDIX D

PROFESSIONAL PANEL MEMBERS

Selected Panel of Professionals

The following is an alphabetical list of the professionals who took part in either the Delphi study and/or the survey.

Mr. Dean Cramer
Director of Iowa Central Telecommunications Network
Iowa Central Community College, Ft. Dodge, IA.

Mr. Rich Gross
Director of Telecommunications, Kirkwood Community College, Cedar Rapids, IA.

Mr. Gary Feddern
Director of Television Center, Iowa Lakes Community College, Estherville, IA.

Dr. Robert Hardman
Director and Professor, Center for Educational Technology, University of Northern Iowa.

Dr. Ellen Kabat
Director of Telecommunications, Eastern Iowa Community College District, Davenport, IA.

Dr. Michael Simonson
Professor, College of Education, Iowa State University.

Dr. Sharon Smaldino
Associate Professor, Curriculum and Instruction
College of Education, University of Northern Iowa.

Mr. Jon Weih
Program Manager, Kirkwood Telecommunications System,
Kirkwood Community College, Cedar Rapids, IA.

APPENDIX E

HUMAN SUBJECTS CLEARANCE LETTER

The University of Northern Iowa

September 16, 1993

Mr. Terry Gord
2304 College, Ed Media 0301
Cedar Falls, IA 50614

Dear Mr. Gord:

Your project, "Identification and Analysis of Factors Important to the Success of Interactive Distance Education", which you submitted for human subjects review on September 7, 1993 has been determined to be exempt from further review under the guidelines stated in the UNI Human Subjects Handbook. You may commence participation of human research subjects in your project.

Your project need not be submitted for continuing review unless you alter it in a way that increases the risk to the participants. If you make any such changes in your project, you should notify the Graduate College Office.

If you decide to seek federal funds for this project, it would be wise not to claim exemption from human subjects review on your application. Should the agency to which you submit the application decide that your project is not exempt from review, you might not be able to submit the project for review by the UNI Institutional Review Board within the federal agency's time limit (30 days after application). As a precaution against applicants' being caught in such a time bind, the Board will review any projects for which federal funds are sought. If you do seek federal funds for this project, please submit the project for human subjects review no later than the time you submit your funding application.

If you have any further questions about the Human Subjects Review System, please contact me. Best wishes for your project.

Sincerely,

Norris M. Durham, Ph.D.
Chair, Institutional Review Board

cc: Dr. David A. Walker, Associate Dean
Dr. Charles Johnson

Graduate College 1 Seerley Cedar Falls, Iowa 50614-0702 (319) 273-2748